ENVIRONMENTAL ASSESSMENT FOR LAKEVIEW WATERFRONT CONNECTION

April 2014

Final:

Prepared For:

Credit Valley Conservation
Regional Municipality of Peel
and
Toronto and Region Conservation Authority

Prepared By:

SENES Consultants

Region of Peel Working for you

CVC Credit Valley Conservation

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EXECUTIVE SUMMARY

INTRODUCTION

Credit Valley Conservation (CVC) and the Region of Peel with the support of the City of Mississauga and the Toronto and Region Conservation Authority (TRCA), are proceeding with the Environmental Assessment (EA) for the Lakeview Waterfront Connection (LWC) Project. Given their extensive experience with large scale shoreline enhancement and wetland creation projects, TRCA is managing the EA on behalf of the CVC and the Region of Peel, who are the co-*proponents*.

The goal of the LWC Project is "*to create a new natural park that will establish ecological habitat and public linkages on the eastern Mississauga waterfront*".

The objectives are:

1. **Naturalization -** Establish a diverse range of native terrestrial and aquatic ecosystem habitats and linkages in a degraded area of the eastern Mississauga waterfront.
2. **Access -** Create safe and accessible public linkages for access to and along the waterfront including the Waterfront Trail while allowing for compatible recreational, educational and cultural heritage opportunities.
3. **Compatibility -** Ensure that the LWC is compatible with existing infrastructure.
4. **Coordination -** Coordinate with and inform other local planning and development initiatives.
5. **Fiscal Viability -** Develop an innovative funding approach that maximizes public benefit and value by reusing locally generated fill from existing municipal (regional and local) capital works projects and private sector sources as required.

CVC and the Region of Peel will have joint responsibility for ensuring that the design, construction, operation, maintenance and management of the LWC is pursuant to this and other EA approvals including taking responsibility for compliance with the terms and conditions of EA approvals. It is understood that the construction, operation, maintenance and management of some project components will require continued integration and cooperation with other agencies, entities and land owners. It is anticipated that CVC will take the lead in ensuring EA compliance. In addition, some aspects of the actual design and/or construction may be delegated to others such as TRCA, in addition to the role of providing oversight.

This EA has been prepared in accordance with the approved ToR and the requirements of subsection 6.1(2) of the *EA Act*. It generally follows the "Code of Practice: Preparing and Reviewing Environmental Assessments in Ontario" (MOE 2009a).

Other environmental authorizations and approvals that will likely need to be secured in support of the LWC Project are summarized in Chapter 1.

PURPOSE OF THE UNDERTAKING

Chapter 2 provides a description of the purpose of the LWC Project. The description is framed in terms of both the problem (an ecologically degraded and disconnected area of waterfront) and the opportunity (creating aquatic and terrestrial habitats including naturalization of shoreline and creeks and providing for public access to and along the waterfront) that the LWC Project presents.

There is a long history of planning, public engagement and scientific studies with respect to the eastern Mississauga waterfront. A number of documents describing issues and opportunities along the Lake Ontario shoreline and nearshore areas have been developed for Mississauga, Toronto and Lake Ontario as a whole, and are applicable to the LWC Project. These documents are summarized in Chapter 2.

Study Areas

Two specific study areas have been defined for the LWC Project. The LWC Regional Study Area is a broad area in which direct and indirect effects of the LWC construction and establishment may appear. The LWC Project Study Area is the area identified to create ecological habitat and public linkages. The two study areas are presented in Figures ES-1 and ES-2.

Figure ES-1 LWC Regional Study Area

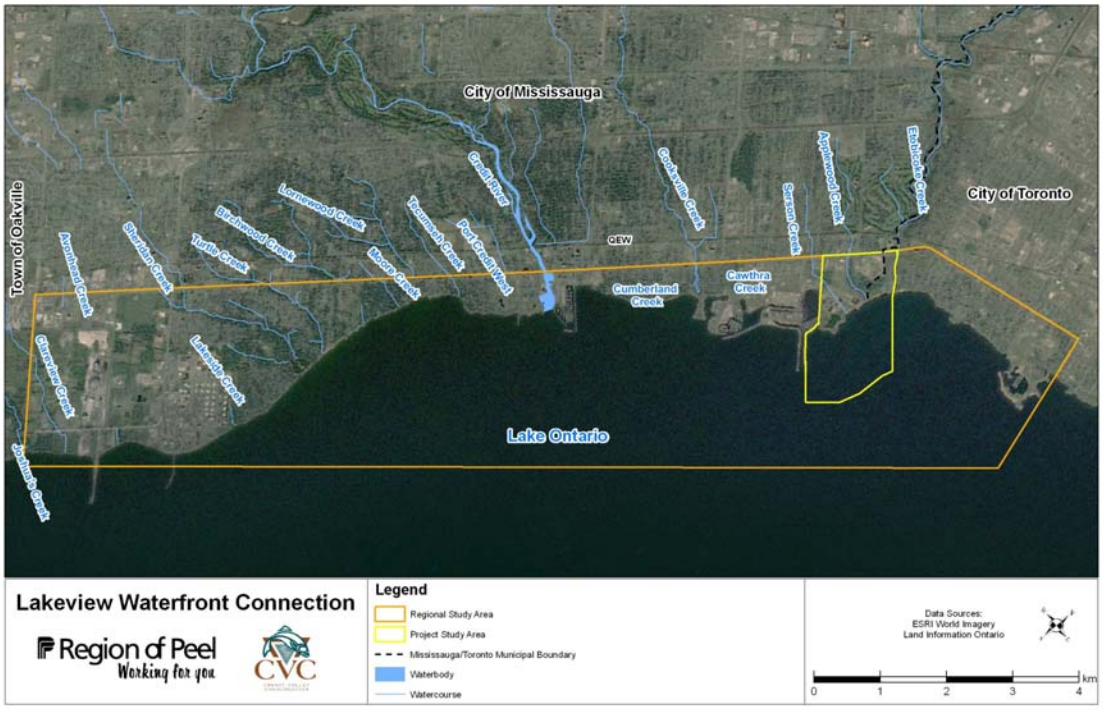

Figure ES-2 LWC Project Study Area

DESCRIPTION OF THE POTENTIALLY AFFECTED ENVIRONMENT

The chapter is divided into three sections which capture different components of the environment. The first section describes the coastal and fluvial characteristics, including aquatic habitat, which will influence the development of 'Alternative Methods'. The second section describes the remaining components of the natural environment: terrestrial vegetation and wildlife, and soils and geology. The third section describes socioeconomic components: existing and planned land use, land ownership, archaeology, cultural heritage, recreation and Aboriginal interests.

Shoreline & River Processes & Conditions

- Current shoreline conditions within the LWC Regional and Project Study Areas are a function of natural coastal process and modifications that have occurred over time as the area has been urbanized. Baseline shoreline conditions provide insight into potential shoreline configurations that will be proposed as LWC Project 'Alternative Methods'.

- The shoreline types within the LWC Project Study Area include a sandy cobble beach at Marie Curtis Park West; a remnant beach located south of the WWTF (which is bounded by two armoustone headlands); armourstone and revetment south and west of the WWTF; and concrete reinforced barges, used to create the eastern pier off OPG's Lakeview site.
- As the majority of the shoreline within the LWC Regional Study Area has been armoured, the resulting elimination of bluff erosion has produced sediment starved littoral conditions along this portion of the Lake Ontario waterfront.
- Local creeks (Serson and Applewood) provide hydraulic, organic and sediment inputs to natural features such as wetlands and will inform the potential locations of wetland features that are created as part of the LWC Project. Baseline creek conditions will also inform the design of new reaches through the LWC Project footprint.
- Water quality is impaired in both Serson and Applewood Creek and Lake Ontario within the Project Study Area and large algal blooms are known to occur due to high nutrient loads.
- Approximately, 72% of the total wave power comes from the east, approximately 22% comes from the southwest and the remaining 6% is distributed over all other directions.

Aquatic Habitat

- Up to 75% of historic wetlands within heavily settled Great Lakes environments have been lost to activities such as land use change, filling, dredging, and disturbance (Whillans 1982).
- The Lake Ontario shoreline within CVC's jurisdiction is almost completely hardened, with only 20% of the shoreline retaining some natural structure and function.
- Historical stonehooking activities along the Mississauga shoreline resulted in changes in, and destruction of, nearshore aquatic habitat through the removal of structure and shelter for fish, including the now extinct Lake Ontario population of Atlantic Salmon (Martin 2007). The loss of virtually all cobble substrates and the elimination of Lake Trout spawning reefs are also attributed to stonehooking (Whillans 1979), with estimates of as much as 4 million tonnes having been removed from the nearshore Regional Study Area (CVC unpublished).
- Past land creation and shoreline modifications associated with OPG's Lakeview site and the Region of Peel's G.E. Booth Wastewater Treatment Facility (WWTF) were undertaken to allow for the expansion and protection of industrial activities, and did not consider fish or wildlife habitat.

Terrestrial Habitat

- The natural terrestrial habitats within the LWC Project Study Area are isolated from each other by industrial lands associated with OPG's Lakeview site, the WWTF and the

hardening of the shoreline. East-west connections along the shoreline and via offshore aquatic habitat may offer limited connectivity; however, uninterrupted terrestrial connections do not exist.

- An historical air photo from 1945 suggests that a significant linear open water wetland that was protected by a long barrier beach along the shore of Lake Ontario likely connected the mouths of Etobicoke, Applewood and Serson Creeks; however this feature no longer exists.

Socio-Economic Environment

- Existing land uses within the LWC Regional Study Area are residential, commercial, industrial, institutional, open space/greenbelt, vacant lands (City of Mississauga, 2012), and parks (City of Toronto, 2002).
- A number of planning initiatives will inform and will be informed by the LWC Project planning process including, including but not limited to the following: Inspiration Lakeview; Inspiration Port Credit; The Lakeview and Port Credit District Policies Review; The Port Credit Local Area Plan; and the Marie Curtis Park Revitilization Plan.
- Recreational activities in the Regional and Project Study Areas are dominated by walking, fishing, cycling, public boat launching, kite boarding/wind surfing, sea kayaking, nature appreciation, beach volleyball and dogs-off leash areas. This area is also a popular location for socially undesireable activities.
- All archaeological surveys indicated that that underlying soils were highly disturbed and that there is low potential for any remaining archaeological resources. No significant marine archaeological resources were found in the LWC Project Study Area.
- The LWC Project Study Area has a strong link with Canadian wartime history, including the Boer War, the Great War, and World War II. Within the LWC Project Study Area, a number of properties are recognized for their direct association with this history

DESCRIPTION, EVALUATION AND RATIONALE FOR 'ALTERNATIVES TO' THE UNDERTAKING

The 'Alternatives To' the LWC Project are defined as:

- *'Do Nothing'*. This alternative will retain the existing conditions along the waterfront and nearshore but will include already approved or planned improvements to the Arsenal Lands and Marie Curtis Park. The 'Do Nothing' alternative would see no changes to the existing waterfront area in the LWC Project Study Area. While the 'Do Nothing' alternative meets the Compatibility objective of the LWC Project, it does not meet the other four objectives. In addition, this alternative would not achieve the goal of the LWC Project.

- *Create new natural waterfront park on existing land*. This alternative will examine whether or not there is the potential to create habitat and public linkages on the existing land base. While this alternative does meet the Compatibility objective of the LWC Project, it does not meet any of the other four objectives. In addition, because new ecological habitat will not be created and public linkages to the waterfront will not be created, this alternative also does not meet the goal of the LWC Project.
- *Create new natural waterfront park on new created land*. This alternative involves creating new natural parkland along the waterfront to establish diverse aquatic and terrestrial habitats and to improve public access and recreational opportunities. This would be accomplished through the reuse of clean fill, generated by municipal and private capital projects. This alternative will or has the potential to meet the goal as well as all five LWC Project objectives.

As there is no potential to create habitat and public linkages on the existing land, new land must be created to establish the new natural waterfront park. For all of the LWC Project objectives, the creation of ecological habitat and public linkages through the creation of land is the preferred way to solve the identified problem/opportunity when compared to doing nothing or using the existing land base. Therefore, alternatives involving land creation have the greatest potential to meet the LWC Project objectives and will be carried forward to the development of 'Alternative Methods'.

DESCRIPTION, EVALUATION AND RATIONALE FOR 'ALTERNATIVE METHODS' OF CARRYING OUT THE UNDERTAKING

'Alternative Methods' are different ways of doing the same activity. In the context of the LWC Project, 'Alternative Methods' are similar ways of designing a new natural waterfront park on created land with ecological habitat and public linkages within the LWC Project Study Area. The identification and evaluation of 'Alternative Methods' was carried out in a four-step process, depicted in Figure ES-3.

Utilizing this framework, five alternative LWC Project configurations were generated and are depicted in Figure ES-4. Each alternative LWC Project configuration included a similar breakdown of habitat type, accommodated flows from Applewood and Serson Creeks in the wetland design, and assumed an upset limit of approximately 2 million cubic metres of fill to establish their respective footprints. The alternative LWC Project configurations varied from each other based on different shoreline treatments and the resulting differences in function arising from the shoreline treatments. The five alternative LWC Project configurations were evaluated using criteria and indicators developed by the LWC EA Technical Team and reviewed by a number of stakeholders. A summary of the comparative evaluation by objective is presented in Table ES-1.

Figure ES-3 Framework to Identify and Evaluate 'Alternative Methods'

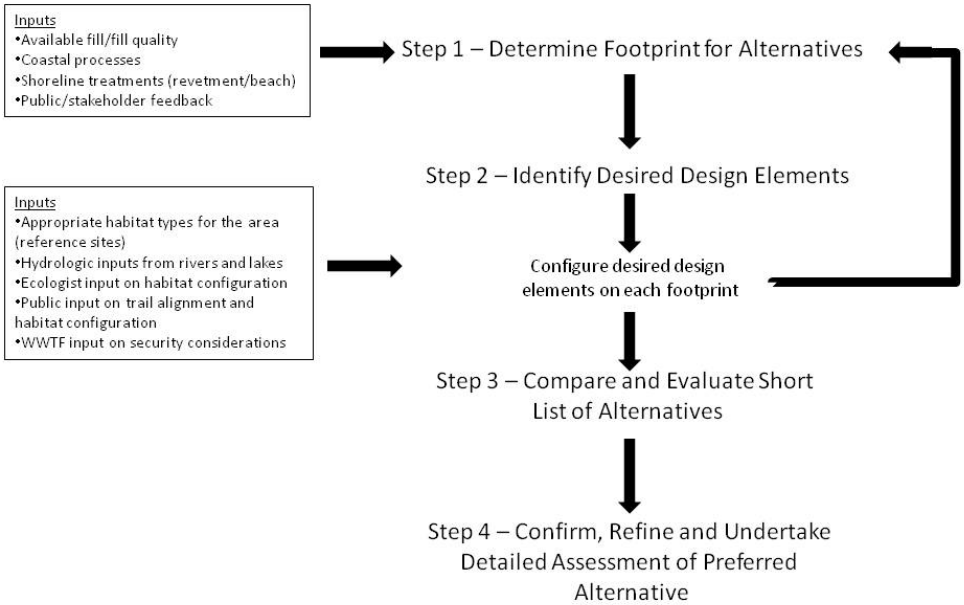

Figure ES-4 Alternative LWC Project Configurations

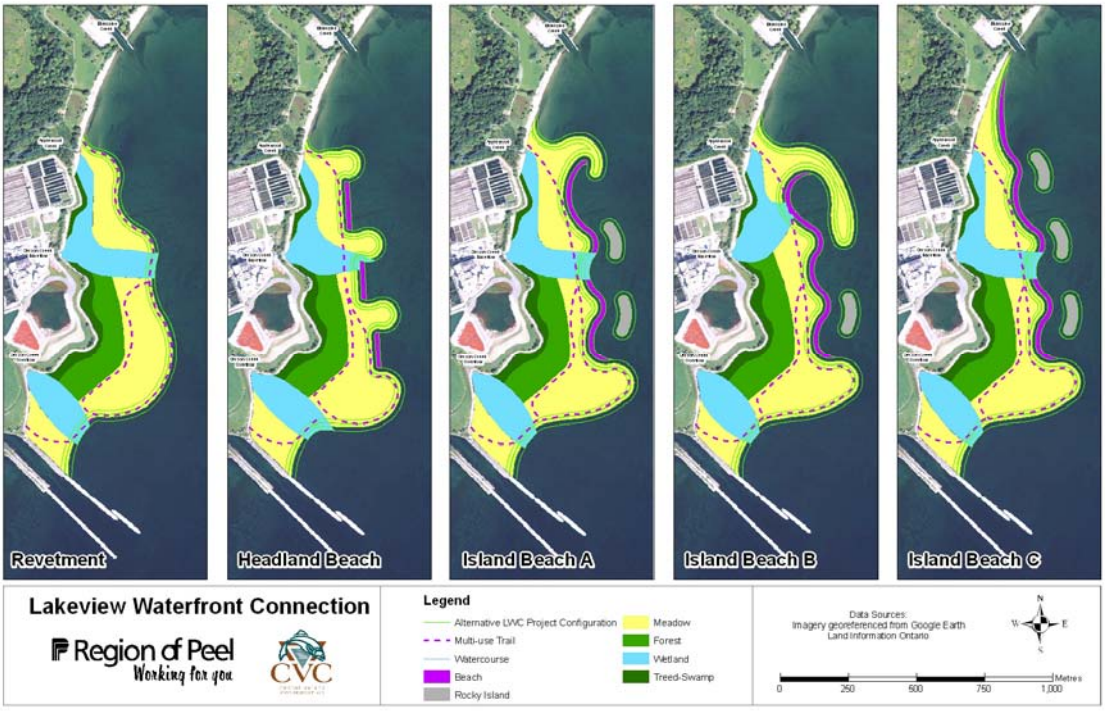

Table ES-1 Summary of Comparative Evaluation by Objective

Objective	Revetment	Headland Beach	Island Beach A	Island Beach B	Island Beach C
Naturalization	LEAST PREFERRED	MODERATELY PREFERRED	MOST PREFERRED	MOST PREFERRED	MOST PREFERRED
Access	LEAST PREFERRED	MODERATELY PREFERRED	MOST PREFERRED	MODERATELY PREFERRED	MODERATELY PREFERRED
Coordination	LEAST PREFERRED	MODERATELY PREFERRED	MOST PREFERRED	MOST PREFERRED	MOST PREFERRED
Fiscal Viability	MOST PREFERRED	MODERATELY PREFERRED	LEAST PREFERRED	LEAST PREFERRED	MODERATELY PREFERRED
SUMMARY	**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MODERATELY PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**

Based on the comparative evaluation, Island Beach C was selected as the LWC Preferred Alternative. A PIC was held on April 3, 2013 to present the selection of the LWC Preferred Alternative to the public. The primary purpose of this PIC was to confirm the selection of Island Beach C and determine if the public wanted to see any further refinements to Island Beach C prior to initiating the detailed effects assessment.

At the PIC, some members of the public indicated that they would prefer to maintain more of the existing sand beach at Marie Curtis Park. They indicated a desire to have the footprint for the Preferred Alternative scaled back along the beach so it does not extend to the mouth of Etobicoke Creek.

Utilizing this feedback from the public, the LWC Technical Team reviewed potential design options that would transition to the exiting beach at a point closer the WWTF. The solution was to include a small groyne structure at approximately the midpoint between Applewood Creek and Etobicoke Creek that would anchor the Preferred Alternative without extending east to Etobicoke Creek. This refinement to the Preferred Alternative is presented in detail in Chapter 6 and the detailed assessment of the Preferred Alternative is presented in Chapter 7.

DESCRIPTION OF THE LWC PROJECT PREFERRED ALTERNATIVE

This chapter describes the conceptual design of the LWC Project Preferred Alternative, construction techniques and a proposed phasing plan for construction. To ensure that the EA captures the greatest potential negative effects from the LWC Project, the LWC Project Preferred Alternative presented in this chapter, and the effects assessment presented in Chapter 7, is based on the upset limit of 2.0 million cubic metres of fill (Figure ES-5).

Figure ES-5 Overview of the LWC Project Preferred Alternative

Key components of the conceptual design include:

- Armour stone revetments;
- Cobble beach;
- Offshore islands (headlands);
- Extensions to Applewood and Serson Creek and their outlets to Lake Ontario;
- Upstream re-routing of Serson Creek;
- Serson Creek stormwater channel habitat enhancements;
- River levee systems;
- Naturalized habitat features including meadow, upland forest, wetland and treed swamp;
- Aquatic habitat features;
- Recreational spaces including primary and possibly secondary and tertiary trails.

The LWC Project Preferred Alternative will require on-going maintenance activities associated with a number of the design components. These include maintenance of sediment, debris and ice management features, naturalized areas (including terrestrial, wetland and aquatic habitat), flood protection and recreational features.

Construction Access Routes

The alternative site access routes were developed by looking at logical historic and existing access points along Lakeshore Road east of the WWTF. Three potential access points were identified:

1. The existing eastern access to the WWTF;
2. The intersection of Lakeshore and Dixie (southside of Lakeshore) or the former entrance to the Small Arms Building in the Arsenal Lands; and
3. 1400 Lakeshore Road which is a former driveway on the southside of Lakeshore and is part of the Arsenal Lands.

Five alternative routes were developed between the alternative access points and end point. It is assumed that all routes will include a 12 m wide road bed, allowing 2 way traffic and that the road beds will be built to high quality standards to minimize maintenance due to wear and tear by the anticipated truck volumes.

The evaluation of the alternative site access routes has been structured around environmental, social, cultural, technical and cost components and seeks to identify the site access route which minimizes effects to each component. A summary of the evaluation of alternative site access routes is presented in Table ES-2. In the event that construction access is available through the OPG Lakeview site, the LWC Project Team will endeavor to amend the EA to take advantage of this opportunity.

Table ES-2 Overall Summary of Access Route Evaluation by Component

Environmental Component	Route 1	Route 1B	Route 2	Route 3	Route 3B
Natural Environment	LEAST PREFERRED	MODERATELY PREFERRED	MOST PREFERRED	LEAST PREFERRED	MOST PREFERRED
Social Environment	MOST PREFERRED	MODERATELY PREFERRED	MOST PREFERRED	LEAST PREFERRED	LEAST PREFERRED
Cultural Environment	MOST PREFERRED	LEAST PREFERRED	LEAST PREFERRED	MOST PREFERRED	LEAST PREFERRED
Technical/Engineering	LEAST PREFERRED	LEAST PREFERRED	MOST PREFERRED	MODERATELY PREFERRED	MOST PREFERRED
Cost	MODERATELY PREFERRED	LEAST PREFERRED	MODERATELY PREFERRED	MOST PREFERRED	MODERATELY PREFERRED
SUMMARY	**MODERATELY PREFERRED**	**LEAST PREFERRED**	**MOST PREFERRED**	**MODERATELY PREFERRED**	**MODERATELY PREFERRED**

Phasing Plan and Construction Steps

The phasing plan for constructing the Preferred Alternative consists of two build-out scenarios as identified below.

Build-out Scenario 1 – OPG Waterlot Available at Commencement of Construction

Stage 1 – Land creation through establishment of 5 construction cells (depending on fill supply) filled sequentially connecting to the OPG pier.

Stage 2 – Park development on entire footprint connecting to the OPG pier.

Build-out Scenario 2 – OPG Waterlot not Available at Commencement of Construction

Stage 1 – Land creation through establishment of 4 construction cells filled sequentially connecting to the existing shoreline north of the OPG waterlots.

Stage 2 – Park development tie off to existing shoreline north of the OPG waterlots.

Stage 3 – Land creation of the final cell connecting to the OPG pier (if the waterlot becomes available at a later date).

Stage 4 – Park development to the OPG pier.

Since it is anticipated that construction will occur over a period of 7-10 years, it is anticipated that shore protection works and subsequent filling activity would be done as a series of cells where a temporary berm would be installed for a cell and tied off to the existing shoreline. Filling and grading activity could occur within a completed cell concurrently with shore protection works for the next cell. It is likely that the entire footprint would involve construction of 4-5 individual cells constructed one after the other. Stage 2 will include park development, including trail construction, creek crossings, signage and landscaping.

DETAILED ASSESSMENT OF THE PREFERRED ALTERNATIVE

The effects assessment is based on the LWC Project utilizing 2.0 million m^3 of clean fill to capture the "worst-case scenario" for any effects. A smaller potential footprint size of the Preferred Alternative, utilizing a lower limit of 1.5 million m^3 of clean fill, could also be established depending on the availability of fill material and budget considerations. The smaller footprint would maintain the same general shoreline configuration and habitat features as presented in Chapter 6. To maintain flexibility during detailed design while ensuring the "worst-case scenario" for any effects is captured in the EA, a sensitivity analysis is presented to determine if effects could increase on a smaller footprint.

The positive benefits of the LWC Project in creating a functional ecological system and providing public access to a section of the Mississauga Waterfront that is currently inaccessible are anticipated to greatly exceed any potential negative effects during construction. The establishment/post-establishment phase of the LWC Project includes a measurable improvement in ecological functioning over existing conditions, and lends itself to the use of minimum design

requirements (i.e., elements of the design that are described in Chapter 6 and must be achieved at the end of construction).

The effects of the LWC Project on the existing environment, as well as proposed mitigation and resulting net effects are described in this chapter. The discussions are organized by LWC Project objective; and divided between construction effects and establishment/post-establishment effects. Tables ES-3 to ES-7 below provide a summary of the evaluation for each objective.

Table ES-3 Overall Effects Related to Objective 1 - Naturalization

Criteria	*Indicator*	*Overall Effects*
Construction		
Ability of alternative to be self-compensating with respect to fish habitat	Area of aquatic habitat lost or altered (ha).	Negligible
	HAAT model estimates of area requiring compensation (ha).	None
	Potential disruption to fish habitat as a result of land creation activities (siltation, fish removal, etc.	Negligible
Habitat removal or disruption during construction of site access road and laydown area	Area of vegetation removed or disrupted (m^2).	Negligible
	Number of Species at Risk removed/disrupted.	None
	Area of aquatic habitat removed or disrupted (m^2).	Negligible
Establishment/Post-Establishment		
Change in shoreline character	Change in diversity of shoreline types (% increase or % decrease).	Positive
	Quantitative assessment of shoreline irregularity and the ability to provide nearshore habitat.	Positive
Ability to create functional habitat blocks	Area of habitat created (m^2) of wetland, forest, and, meadow.	Positive
	Assessment of improvements to aquatic habitat created and ecological benefits achieved through the changes to Serson and Applewood Creeks.	Positive
	Qualitative assessment of habitat created including benefits created by LWC with respect to filling in missing and/or impaired portions of aquatic and terrestrial ecosystems in this part of the Mississauga waterfront.	Positive
	Qualitative assessment of connectivity between habitats for the movement for wildlife (e.g. mammals, herptofauna, invertebrates, fish, birds, etc.).	Positive
Effects of hydraulics and hydrology / sedimentation on sustainability of wetland communities	Qualitative assessment of ability to manage a full range of flows without adverse impact on wetland communities (high erosional stress, sediment deposits).	Negligible
	Influence of lake level fluctuation on channel and wetland connectivity.	Negligible
	Potential for sedimentation to affect channel form (including river mouths) and associated vegetation.	Negligible
	Qualitative assessments of the adaptability of the wetland function to climate change.	Negligible
	Qualitative assessment to determine the ability of river channels and shoreline works to accommodate changes in flow and lake levels due to climate change.	Negligible
Summary: **Overall, the Preferred Alternative for the LWC Project provides a substantial improvement to natural conditions within the LWC Project Study Area. The loss or alteration of poor quality aquatic habitat is offset by the creation of high quality terrestrial and aquatic habitat, thus, the Preferred Alternative meets the Naturalization objective.**		

Table ES-4 Overall Effects Related to Objective 2 - Access

Criteria	*Indicator*	*Overall Effects*
Construction		
Potential for change in access to and use of Waterfront Trail during construction	Duration and length of trail closed to use	Negligible
	Potential for signalization of trail crossing with construction vehicles.	None
Potential for change to use and enjoyment of park areas including Waterfront Trail during construction	Potential for dust and vehicle emissions and noise to affect Waterfront Trail use and enjoyment	Negligible
	Potential for changes in ability to access and use park during construction due to traffic congestion and or changes to access	Negligible
Potential for displacement of built heritage resources due to construction of access road, laydown area and land creation area	Cultural heritage value of built heritage resources and cultural heritage landscapes within land creation area	None
Potential effects from construction of access road, laydown area and land creation area on marine- and land-based archaeological resources	Significance of archaeological resources within footprint of land creation and associated park area	Negligible
Potential for effect from construction of access road, laydown area and land creation area on traditional uses of lands by First Nations and Métis	Extent of traditional uses of lands within LWC Project Study Area	None
Establishment/Post-Establishment		
Potential for lookout areas	Number of opportunities for views and character of views from the LWC Project to Lake Ontario, OPG's Lakeview site to Lake Ontario and back to the cities of Mississauga and Toronto and from the Lake Ontario onshore	Positive
Potential for changes to use of waterfront for recreation	Potential for changes to water quality at Marie Curtis Beach West with respect to swimming	Negligible
	Potential for changes to existing recreational activities on the sand beach at Marie Curtis Park west	Negligible
	Potential for changes to use for windsurfers and/or kiteboarders	Negligible
Potential for public access to water's edge	Percentage of accessible water's edge	Positive
	Potential to create tiered trail system providing seasonal access	Positive
	Potential to create multi-use trail connection across area of land creation	Positive
Summary: **Construction of the LWC Project will result in some disruptions to Waterfront Trail and Marie Curtis Park users due to alternations to Waterfront Trail access and construction activity. There will also be a net loss in existing sand beach at the water's edge following construction. These effects are offset by a substantial net gain in beach access and access to the water's edge plus a continuous Waterfront Trail connection through the new landform where no water access is currently available. Overall, the Preferred Alternative for the LWC Project meets the Access objective.**		

Table ES-5 Overall Effects Related to Objective 3 - Compatibility

Criteria	*Indicator*	*Overall Effects*
Construction		
Potential for construction traffic to affect traffic volumes on arterial roads and access and egress from arterial roads	Additional vehicle traffic on arterial roads resulting from construction vehicle movements	Negligible
Potential for construction traffic volumes to require changes to intersections	Number of intersections requiring changes to facilitate LWC related construction traffic	Negligible
Potential to affect operations at WWTF	Changes in access to outfall during construction	Negligible
Potential for effects to water quality at Water Treatment Plant intakes	Potential for effects during construction	Negligible
Establishment/Post-Establishment		
Potential to affect operations at WWTF	Changes in access to outfall during establishment/post-establishment.	None
Potential for effects to water quality at Water Treatment Plant intakes	Potential for effects during establishment/post-establishment	Positive/none
Changes to site security for WWTF	Ability to maintain/enhance site security for the WWTF	Negligible
Changes to parking capacity	Potential to affect existing parking capacity at Marie Curtis Park and adjacent areas	Negative
Summary: **The Preferred Alternative will not result in significant traffic disruptions and will not have an adverse effect on existing infrastructure at the WWTF or Water Treatment Plant. Overall, the Preferred Alternative for the LWC Project meets the Compatibility objective.**		

Table ES-6 Overall Effects Related to Objective 4 - Coordination

Criteria	*Indicator*	*Overall Effects*
Construction		
Consistency with Marie Curtis Park Revitalization Plan	Ability to integrate recreational opportunities and trails between the LWC, Arsenal Lands and Marie Curtis Park	Positive
Establishment/Post-Establishment		
Consistency with City of Mississauga Waterfront Parks Strategy (2008)	Consistency of alternative with Waterfront Parks Strategy	Positive
Consistency with the Visioning for Inspiration Lakeview	Consistency of alternative with Visioning for Inspiration Lakeview	Positive
	Ability to integrate alternative with potential plans for OPG's Lakeview site	Positive
Consistency with LOISS	Consistency of alternative with priorities identified by LOISS	Positive
Consistency with Lake Ontario Biodiversity Strategy	Consistency of alternative with priorities identified by the Lake Ontario Biodiversity Strategy	Positive
Consistency with Marie Curtis Park Revitalization Plan	Ability to integrate recreational opportunities and trails between the LWC, Arsenal Lands and Marie Curtis Park	Positive
MNR Lake Ontario Fish Community Objectives	Consistency with the goals of the MNR Lake Ontario Fish Community Objectives	Positive
Consistency with CVC's hazard land guidelines and regulations.	Potential for flooding as a result of land creation	Positive
Summary: **Construction and establishment of the LWC Project will have positive effects on other plans and policies within the Project and Regional Study Areas. Overall, the Preferred Alternative for the LWC Project meets the Compatibility objective.**		

Table ES-7 Overall Effects Related to Objective 5 – Fiscal Viability

Criteria	*Indicator*	*Overall Effects*
Construction		
Capital development cost	Capital Construction Cost estimate	n/a
Amount of fill material to be diverted from rural disposal sites	Volume of earth fill (soil) placed, brick rubble and concrete in cubic metres	Positive
Economic and employment benefits	Economic Output (all provinces combined)	Positive
	Gross Domestic Product (all provinces combined)	Positive
	# of direct full time jobs created	Positive
	# of indirect full time jobs created	Positive
	# of induced full time jobs created	Positive
Establishment/Post-Establishment		
Annual maintenance costs for naturalized area	Annual cost of maintenance of naturalized and park areas	n/a
Summary: **Based on support from the Region of Peel Council, the LWC Project meets the fiscal viability objective.**		

A sensitivity analysis to determine if effects could increase on a smaller footprint confirmed that negative effects would not increase on a smaller footprint.

MONITORING AND ADAPTIVE ENVIRONMENTAL MANAGEMENT

A comprehensive monitoring program is a critical element of the LWC Project and several functions throughout the life of the DMNP:

1. Baseline conditions monitoring during pre-design and detailed design will continue to provide data that will inform detailed design elements and identify changes to the existing environment that may affect project outcomes.
2. EA compliance monitoring will ensure compliance with EA commitments and ensure that the LWC Project is constructed according to the final design elements; and
3. Environmental performance monitoring will measure if the LWC Project functions as intended during Establishment/Post-Establishment and facilitate Adaptive Environmental Management of the new system.

A comprehensive adaptive environmental management (AEM) approach will be used to address long term environmental change, maintain flexibility in strategies to achieve desired outcomes, and to ensure that up-to-date information is available for detailed design. This will ensure that the LWC Project continues to function as designed and project objectives continue to be achieved through positive feedback mechanisms.

The AEM framework is a cycle of monitoring, evaluation, adaptation and learning that will allow designers and project managers to maximize project benefits while minimizing negative effects. The details of the plan will be defined during detailed design as project designs are finalized.

EA AMENDMENT PROCESS

The AEM strategy may trigger proposed modifications to the project design and/or construction scheduling if project objectives are not being achieved. A detailed method to identify the types of modifications that will trigger further environmental approval (EA amendments) was developed for this purpose.

CVC will be responsible for reviewing monitoring data and identifying opportunities to alter or improve the project management, design and/or construction phasing. CVC and Region of Peel may also identify modifications to project design or construction scheduling based on other factors such as fill availability. When a need to modify the LWC Project is identified, an internal

effects assessment will be conducted to assess the impact of the modifications on environmental components (as predicted in the EA) and desired project outcomes. Wherever possible, any proposed modifications will minimize adverse environmental effects and/or maximize project benefits. This effects assessment will determine the need (or lack thereof) for further review by the appropriate regulatory body, such as the MOE.

If modifications to the LWC Project do not worsen the predicted effects and do not represent a major perceived change from the perspective of the public and/or agencies, they can be easily implemented through the existing regulatory process.

CONSULTATION

Chapter 10 documents the public, agency, First Nations and Métis consultation activities that took place as part of the LWC Project EA. Consultation for the LWC Project EA was coordinated according to the MOE Code of Practice: Consultation in Ontario's Environmental Assessment Process (MOE, 2007).

LWC Project consultation that took place in the Feasibility Study and Terms of Reference (ToR) stages of the LWC Project is detailed in the Record of Consultation that was submitted with the ToR in July of 2012 (Appendix A). This Record of Consultation provides details of consultation that took place between August 16, 2011 and December 12, 2013.

Throughout the LWC Project EA, the LWC Project team strove to provide appropriate, flexible and convenient opportunities for consultation and clear documentation of all consultation activities. CVC and the Region of Peel facilitated various and diverse opportunities for the public and interest groups to provide input into the LWC Project EA. Consultation initiatives brought stakeholders and community members together in a way that channeled community energy and fostered support for the LWC Project. Many interested parties were invited to and participated in the consultation activities outlined in this chapter.

ADVANTAGES AND DISADVANTAGES

In concluding the EA, the overall advantages and disadvantages of the LWC Project need to be articulated and assessed. Advantages are positive net effects to the natural and human environment, and disadvantages are negative net effects. Table ES-8 summarizes the key advantages and disadvantages of the LWC Project.

Table ES-8 Advantages and Disadvantages of the LWC Project

Project Objective	Advantages	Disadvantages
Naturalization	• Creation of up to 33 ha of terrestrial habitat including meadow, beach, forest, open wetland, treed swamp and rocky island; • Enhancement of 6 ha of open coast habitat; • Increase in the irregularity and diversity of shoreline types including an overall increase in shoreline length and improvement of aquatic habitat; and • Increase in the amount and availability of aquatic habitat in Serson and Applewood Creeks including better connections with Lake Ontario and incorporation of habitat features such as rocky ramps and improved riparian vegetation. The LWC Project connects 1,800 m of aquatic habitat in Serson Creek that is currently inaccessible to fish.	• Land creation will result in the loss or alteration of 39 ha of highly degraded open coast aquatic habitat; • Minor vegetation removal along the construction access route and riparian habitat along Serson and Applewood Creeks during construction; and • Alteration of successional processes on the beach ridge at the mouth of Applewood Creek.
Access	• Addition of 1,110 m of publically accessible cobble beach (with finer gravel/sand material in the northeastern most cell); • A new Waterfront Trail connection linking Marie Curtis Park to the OPG lands along the water's edge; • New views from the created landform to Lake Ontario and back towards Marie Curtis Park, Serson Creek and the cities of Mississauga and Toronto; • Potential for additional secondary trail system; and • Water quality along the Marie Curtis Park beaches are expected to remain the same or improve moderately due to reduced nearshore residence time following storm events from Etobicoke Creek and other contributing local watersheds.	• Closure and re-routing of 770 m of Waterfront Trail during construction; • Nuisance effects from construction (dust, noise, vehicle emissions) for local users; • Net loss or alteration of up to 235 m of publically accessible sand beach at water's edge. Of this 235 m, 50 m will remain largely the same as existing conditions southwest of the groyne structure with predominantly sand/gravel material in summer and transitioning to larger material further southwest.; and • New landform represents a new navigational hazard for windsurfers and kiteboarders.

Table ES-8 Advantages and Disadvantages of the LWC Project (Cont'd)

Project Objective	Advantages	Disadvantages
Compatibility	• Water quality at the Water Treatment Plant intakes is expected to remain the same or improve following construction; and • No negative effects to WWTF outfalls or security.	• Minor increases in traffic during the construction period; and • Additional demand on parking availability in surrounding areas to be discussed with City of Mississauga with respect to provision of parking within Arsenal Lands and Inspiration Lakeview.
Coordination	• Consistent with a number of City of Mississauga Waterfront Parks Strategy goals including improving trail connections and providing more natural, sustainable ecological features; • Consistent with the Visioning for Inspiration Lakeview; • Consistent with the LOISS priorities including restoration of natural ecosystems and creation of terrestrial and aquatic habitat; • Consistent with the Lake Ontario Biodiversity Strategy targets including the creation of aquatic habitat that will restore connections and quality of nearshore waters; • Opportunity to meet future conditions for the Arsenal Lands; • Consistent with Marie Curtis Park Revitalization Plan to provide improved Waterfront Trail connections along the waterfront; and • Consistent with the goals of MNR's Fish Community Objectives for Lake Ontario including opportunities to enhance coldwater piscivore habitat along the nearshore area.	• Access road construction will affect 5 m of Waterfront Trail that has been upgraded as part of the Marie Curtis Park Revitalization Plan.
Fiscal Viability	• ~$160 million in economic output; • ~$80 million in GDP; • ~900 net full time jobs; and • Reduced pressure on rural fill disposal sites.	• None.

A review of Table ES-8 clearly illustrates that the outcomes of the LWC Project are strongly beneficial for all aspects of the environment, resulting in a rejuvenated waterfront that will allow improved public access to the water's edge, provide habitat for fish and wildlife, and be a destination for residents and visitors alike.

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GLOSSARY OF TERMS

Aggradation: Refers to increased creek bed elevation caused by deposition of sediment by rivers and wave action.

Analyte: A substance whose chemical constituents are being identified and measured.

Armourstone: Large irregular hard rock or coarse aggregate used in hydraulic structures such as sea defences and river bank protection.

Backwash: The return flow of water down a beach, after a breaking wave has sent swash up the beach.

Biodiversity: A term describing the variety of species, both flora and/or fauna, contained within an ecosystem.

Blue Flag Beach Status: A certification indicating that a beach meets high environmental and quality standards (see http://www.blueflag.org/).

Chart Datum: A vertical reference system that has been standardized to a reference point to which depths on nautical charts, tidal height predictions and water level measurements are referenced. The referenced chart datum on the Great Lakes is the International Great Lakes Datum (1985). It is generally set at a level below which the water level rarely falls.

Conservation Concern: Ecologists assess the quality of each habitat patch through an evaluation of size, shape and matrix influence. These criteria are weighted together to determine an average measure of habitat quality that corresponds to a 'local rank' or L-Rank ranging from L1 (the highest quality) to L5 (the poorest quality).

Cultural Woodlands: Treed communities with lower tree canopy cover than natural forests due to disturbance, management or being in an early state of succession.

Dynamic Beach: Beach material is moved over time by shoreline erosional and depositional processes.

Ecology / Shoreline Ecology: The biological processes at work within the (shoreline) ecosystem.

Ecosystem: An organic community of plants and animals viewed within its physical environment or habitat, e.g. a freshwater pond, a mixed woodland, or a hedge. An ecosystem can be described as a 'complex of interacting phenomena', within which there are many complicated and often subtle relationships (between climate and vegetation, vegetation and soils, animals and vegetation, and so on).

Ecotone: A region of transition between two biological communities.

Fill: In the context of the LWC Project, fill refers to excess soils, glacial deposits (such as gravel, sand, silt and clay), and bedrock materials produced through the excavation of other infrastructure and development projects that are delivered to the LWC Project Study Area and will be reused locally to create a new land base from which the LWC Project will be created. Fill materials must meet specific Provincial quality conditions in order to be considered acceptable for the LWC Project. .

Fluvial: A term applied in the field of earth sciences to refer to features (morphology) and processes related to flowing water, specifically relating to the rivers, streams, and creeks as it relates to the LWC EA. Fluvial processes, include the movement of sediment due to erosion, transportation and deposition, and the formation of river channel features (morphology) such as (but not inclusive of), sediment bars, banks, channel sinuousity, floodplains, pools, riffles, and islands. The fluvial morphology produced by a river is influenced by the interaction of such fluvial processes as sediment transport, stream volume, stream depth, and stream power. In turn, the fluvial processes are also influenced by the interaction with fluvial morphological features.

Footprint: The size and shape of the land creation area.

Glaciolacrustine Sands: Sediments deposited by glacial meltwater in lakes. These lakes include ice margin lakes or other types formed from glacial erosion or deposition. Sediments in the bedload and suspended load of meltwater streams are carried into lakes and deposited.

Groyne Structure: A cross-shore structure designed to reduce longshore transport on open beaches or to deflect nearshore currents within an estuary.

HAAT Model: Habitat Alteration Assessment Tool (HAAT) is a model that seeks to identify whether there is a net benefit or impairment to the existing ecological function of a project area for a suite of fish species. The HAAT is used by DFO to assess the change in habitat amount and function (from a fisheries perspective) from an existing condition to the proposed modified condition based on the following four variables: area, depth, substrate, and cover.

Habitat: A term used in ecology to describe the specific environment of plants and animals, in which they are able to live, feed, and reproduce.

Herpetofauna: The reptiles and amphibians of a particular region, habitat, or geological period.

Hummocky Topography: A topography that is undulatory with a predominance of closed depressions that minimize surface water runoff and enhance groundwater infiltration.

Littoral Zone: The shallow marginal zone of a body of water where light penetrates to the bottom; usually colonized by rooted vegetation.

Macrophytes: Aquatic plants that grow in or near water. These plants can be emergent, submergent, or floating and can provide cover for fish and substrate for aquatic invertebrates, produce oxygen, and act as food for some fish and wildlife.

Metres above sea level: masl – a standard metric measurement of the elevation of a location in reference to historic mean sea level.

Minimum design requirements: Represent recommended minimum values for the various ecological components of the LWC Project (e.g. minimum wetland area). Wherever possible these values will be maximized through the detailed design, the individual project components can be smaller than these minimum recommendations.

Performance indicators: Relate to the functional ecological attributes of the naturalized system. Performance indicators will be developed based on the monitoring of reference wetlands, baseline monitoring and ecological models.

Random stone placement: Where each stone is placed individually and keyed in with adjacent stones so that it touches adjacent stones on at least three sides.

Revetment: Large interlocking quarried blocks forming a steep wall from the lake bed to the top of the landform.

Rapid Geomorphological Assessment (RGA): Developed by Ontario Ministry of the Environment (1999), the RGA utilizes a qualitative presence/absence approach to assess the instability of urban river channels. Visual signs of channel instability are grouped into four categories: degradation (channel bed downcutting), aggradation (excessive sediment deposition within a channel), channel widening, and planform adjustment (changes in the meander pattern of the channel).

Riparian: The interface between land and a river or stream.

Riprap: A layer of broken stone on the earth surface for protection against erosion by water; extensively used on irrigation channels and river improvement works.

Rapid Stream Assessment Technique (RSAT): Developed by John Galli at the Metropolitan Washington Council of Governments (1996), the RSAT utilizes a more quantitative assessment approach to assess overall channel ecosystem health and functions. The RSAT uses a combination of visual estimates and a numerical scoring system of stream parameters categorized as follows: channel stability; erosion/deposition; instream habitat; water quality; riparian conditions; and biological indicators.

Semi-natural Communities: are those that are, or have been, disturbed by human activities or development and are in various states of succession.

Special stone placement: Refers to installation where each stone is individually placed and keyed very tightly against adjacent stones so that it touches adjacent stones on all four sides. Special placement is generally used on revetments with a single layer primary protection layer.

Stone-hooking: Mining of aggregate and sheets of bedrock from the lakebed for construction purposes conducted in the nearshore areas of Lake Ontario in the 1800s and early 1900s.

Successional Communities: Represents the progression of different types of vegetation communities within an area following past disturbances or initial colonization.

Swash: The turbulent mass of water that flows up a beach, following the breaking of a wave. The swash is most powerful when long surging waves strike the shore.

Till: A deposit laid down by a glacier or ice sheet on a land surface. Till is highly variable in character, depending on the precise manner of deposition, but it is generally highly mixed (with particle sizes ranging from clay to boulders) and poorly stratified.

Tombolo: A narrow spit of beach material that connects the main beach with the headland.

Waterlot: Shoreline and submerged land lot.

1.0 INTRODUCTION

1.1 LWC PROJECT BACKGROUND

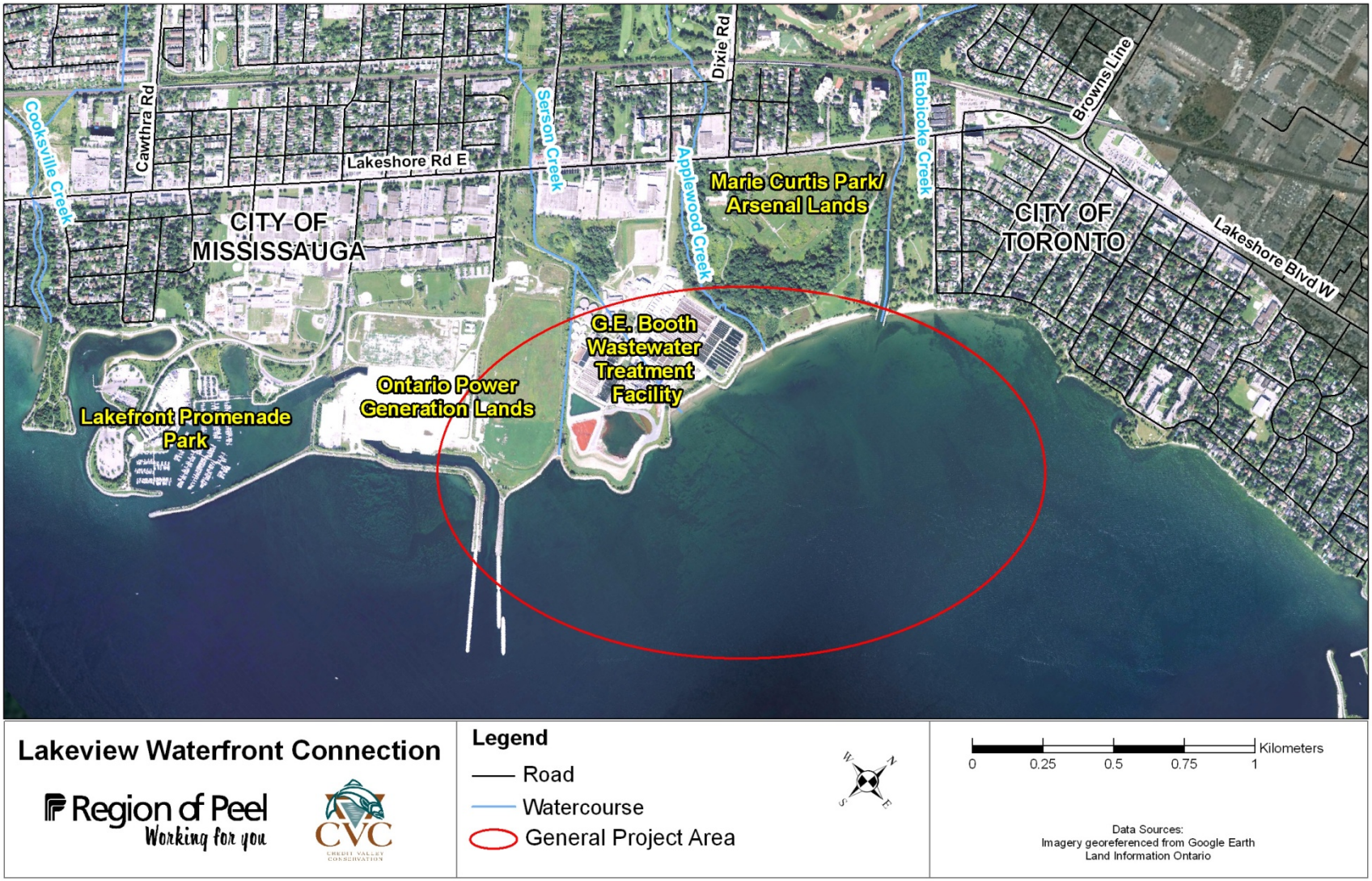
Credit Valley Conservation (CVC) and the Region of Peel with the support of the City of Mississauga and the Toronto and Region Conservation Authority (TRCA), are proceeding with the Environmental Assessment (EA) for the Lakeview Waterfront Connection (LWC) Project. Given their extensive experience with large scale shoreline enhancement and wetland creation projects, TRCA is managing the EA on behalf of the CVC and the Region of Peel, who are the co-*proponents*.

Ultimately, the LWC Project has the potential to create a new natural waterfront park that will provide public access to and ecological enhancements of the eastern Mississauga waterfront between Marie Curtis Park and Ontario Power Generation's Lakeview site (see Figure 1.1). This part of the Mississauga Waterfront has been the subject of many studies seeking to understand the degraded nature of the local ecosystem and identify potential improvements to habitat function, public access and recreational activities. The LWC Project was identified by Inspiration Lakeview (see Section 2.1.1.1 for a full description of Inspiration Lakeview) as a key opportunity to move the Waterfront Trail back to the shoreline. Most recently, the Lakeview Waterfront Connection Feasibility Study (see Section 2.1.1.4 for a full description), completed in January 2012, laid out the rationale for the LWC Project and the degraded habitat and poor public access problems that need to be addressed.

The LWC Project is subject to the requirements of the *Ontario Environmental Assessment Act* (*EA Act*) as an Individual EA. The scope of works and activities anticipated for the LWC Project cannot be covered under the Conservation Ontario Class EA for Remedial Flood and Erosion Control Projects nor the Municipal Class EA. This document is the EA Report which demonstrates the EA process was undertaken in accordance with the Terms of Reference (ToR) that were approved by the Minister of the Environment in December 2012 (see Appendix A). This EA includes:

- Background information;
- Project goals and objectives;
- Purpose of the proposed undertaking;
- EA and approval requirements;
- Description and rational for the proposed undertaking;
- Description of the environment that would potentially be affected by the LWC Project;
- Description of the 'Alternatives to' and 'Alternative Methods' considered and how they were evaluated;
- Adaptive management and monitoring framework; and,
- Consultation activities in support of the EA.

Figure 1.1 General Project Area



The public, agencies, interest groups, and landowners have been consulted throughout the development and preparation of the EA.

In addition, there are a number of other projects and EAs underway in the LWC Project vicinity with which this EA has been integrated. These are discussed in greater detail in Section 2.1.

1.2 PROJECT GOALS AND OBJECTIVES

The development of the LWC Project goal and objectives draws on the historical issues in the LWC Project Study Area (see Section 2.1) and the recent planning efforts and public consultation with respect to the revitalization of Mississauga's waterfront. In addition, consultation specifically focused on the LWC Project goal and objectives has been carried out as part of the development of the ToR and this EA. The goal and objectives have been and will continue to be utilized during the EA to further describe the undertaking and to structure the identification and evaluation of alternatives. All alternatives must meet the LWC Project goal and objectives and alternatives will be evaluated based on how well the goal and objectives are met in addition to identifying the negative effects of the LWC Project on the environment.

The goal is a statement of the overriding purpose of the LWC Project. The LWC Project objectives are statements of what the LWC Project is trying to achieve once implemented. The LWC Project objectives structure the identification and evaluation of alternatives since all objectives must be met for the LWC Project to be implemented. Therefore, all evaluation criteria and indicators are focused on measuring the achievement of the objectives.

The goal of the LWC Project is "*to create a new natural park that will establish ecological habitat and public linkages on the eastern Mississauga waterfront*".

The objectives are:

1. **Naturalization -** Establish a diverse range of native terrestrial and aquatic ecosystem habitats and linkages in a degraded area of the eastern Mississauga waterfront.
2. **Access -** Create safe and accessible public linkages for access to and along the waterfront including the Waterfront Trail while allowing for compatible recreational, educational and cultural heritage opportunities.
3. **Compatibility -** Ensure that the LWC is compatible with existing infrastructure.
4. **Coordination -** Coordinate with and inform other local planning and development initiatives.
5. **Fiscal Viability -** Develop an innovative funding approach that maximizes public benefit and value by reusing locally generated fill from existing municipal (regional and local) capital works projects and private sector sources as required.

The first objective, *Naturalization*, considers the establishment of higher quality terrestrial and aquatic habitat and linkages along the waterfront and creeks within the LWC Project Study Area. The naturalization of the shoreline and creeks will improve aquatic and terrestrial habitat conditions in a degraded area of the Mississauga waterfront, and over the long-term will:

- improve linkages between habitats;
- enhance biodiversity of aquatic and terrestrial habitat and species; and
- improve ecological health providing better resiliency to future changes in the environment.

The LWC Project aims to create aquatic and terrestrial habitat linkages between the waterfront and existing parks and natural corridors. This objective is consistent with the broader objectives articulated in other studies such as the Green Move in Inspiration Lakeview, CVC's Lake Ontario Integrated Shoreline Strategy (LOISS), CVC's Natural Heritage Strategy: Landscape Scale Analysis, City of Mississauga's Natural Heritage Strategy, Lake Ontario Biodiversity Strategy – The Beautiful Lake and the Fish Community Objectives for Lake Ontario (GLFC 2013).

The second objective, *Access*, recognizes that the LWC Project can encourage and contribute to the development of compatible recreation, education and cultural heritage opportunities along the waterfront by creating linkages between existing amenities as well as creating new opportunities with a new natural waterfront park. This objective is consistent with Inspiration Lakeview. Recreational opportunities will include providing accessible multi-use trails and passive recreation including picnicking and fishing. In particular, the LWC Project should improve the Waterfront Trail linkages between Marie Curtis Park and other parks to the west of the LWC Project Study Area. The LWC Project Study Area is also rich in local and regional history.

The third objective, *Compatibility*, recognizes that there is existing infrastructure in the area that must be maintained either by avoidance, modification or relocation. The G.E. Booth Wastewater Treatment Facility (WWTF) and the Lakeview Water Treatment Plant are two key infrastructure features in the immediate vicinity of the LWC Project for which function and access must be maintained. In particular, the outfall and intake structures associated with these facilities need to be protected and maintained. In addition, there are other Region of Peel facilities further west along the waterfront and a City of Toronto Water Treatment Plant east of the general project area and it will be critical that the LWC Project does not adversely affect the function of this infrastructure.

The fourth objective, *Coordination*, aims to integrate the LWC Project with the many other formal and informal planning initiatives that are affecting or will affect the waterfront within the LWC Project Study Area. These include but may not be limited to: Inspiration Lakeview; park Master Plans; and a number of waterfront plans and programs put forward by the Cities of Mississauga and Toronto, Conservation Authorities and other bodies. The Marie Curtis Park Revitalization Plan details a number of improvements aimed at increasing public usage of the lands through enhanced recreational opportunities. CVC's Lake Ontario Integrated Shoreline Strategy is a multi-disciplinary study that will identify priority areas for restoration and conservation of natural heritage features and functions within the defined study area. Mississauga's Waterfront Parks Strategy is a comprehensive long-term plan to manage the future development of the City's waterfront parks. The Strategy identifies priorities for park development, guides park design, recommends programming for each park and identifies criteria for park expansion.

The fifth objective, *Fiscal Viability*, examines the costs associated with implementation of the LWC Project in relation to innovative funding opportunities. The current funding opportunity recognizes that local fill created as a result of infrastructure projects could be regarded as a sustainable "resource" instead of simply waste to be managed. If a beneficial use for the fill could be identified closer to the sites generating the fill, the costs associated with haulage and disposal could be offset and redirected to help pay for the LWC Project.

1.3 LWC PROJECT TEAM

1.3.1 Proponents

CVC and the Regional of Peel have been identified as proponents for this project as it relates to EA legislation. Both have worked co-operatively, with technical input from TRCA and their consultants, and the three levels of government through appropriate departments and agencies to ensure that this project has been coordinated with the many other activities required to revitalize the Mississauga shoreline.

To this end, CVC and the Region of Peel will have joint responsibility for ensuring that the design, construction, operation, maintenance and management of the LWC is pursuant to this and other EA approvals including taking responsibility for compliance with the terms and conditions of EA approvals. It is understood that the construction, operation, maintenance and management of some project components will require continued integration and cooperation with other agencies, entities and land owners. It is anticipated that CVC will take the lead in ensuring EA compliance. In addition, some aspects of the actual design and/or construction may be delegated to others such as TRCA, in addition to the role of providing oversight.

1.3.1.1 Region of Peel

The Region of Peel is a co-proponent of the LWC Project given its interests in the area. The WWTF and surrounding lands, and the key infrastructure that extends out from the shoreline within the LWC Project Study Area, are owned by the Region of Peel. The Region of Peel provided funding to undertake the Feasibility Study and is providing funding for the EA and associated approval process. Should the LWC Project proceed, the Region of Peel will supply fill materials and provide some of the funding for implementation.

1.3.1.2 Credit Valley Conservation

Given that the majority of the LWC Project Study Area is located within CVC's jurisdiction, it was determined that CVC would be one of the co-proponents of the LWC EA and act as the LWC Project lead. CVC is also contributing data to the LWC EA directly and as part of the Lake Ontario Integrated Shoreline Strategy (LOISS). It is anticipated that CVC will own, maintain and operate the new LWC Park once constructed.

In spring 2011, the Region of Peel authorized CVC and TRCA to proceed with a Feasibility Study to assess the potential for creating ecological habitat and public linkages along the eastern waterfront of the City of Mississauga. Conservation Authorities were selected to lead the Feasibility Study and this EA on the basis of three critical functions that they provide along the Lake Ontario waterfront:

- regulatory powers to provide input and review of shoreline plans on behalf of municipal partners through Regulation 160/06 (CVC) and Regulation 166/06 (TRCA);
- leaders of monitoring, stewardship and restoration of the shoreline ecology; and
- ownership and management of environmentally important areas, including high priority waterfront lands.

1.3.2 Technical Support

1.3.2.1 Toronto and Region Conservation Authority

In the spirit of strengthening corporate partnerships and because of the TRCA's long history in undertaking the planning and implementation of large-scale waterfront projects, TRCA provided technical and project management support to CVC for the Feasibility Study of the LWC Project. TRCA also owns the Arsenal Lands and Marie Curtis Park immediately to the east of the WWTF, within the LWC Project Study Area (see Figure 1.1). It is expected that the lands owned by TRCA will be affected by the LWC Project.

The TRCA are managing the EA on behalf of the co-proponents.

1.3.2.2 City of Mississauga

The City of Mississauga is interested in ensuring that any proposed plans along the Mississauga waterfront are in conformance with various planning and guideline documents, including "Inspiration Lakeview: A Vision and Next Steps" (City of Mississauga 2011), the Future Directions: Master Plan for Parks and Natural Areas (City of Mississauga 2009), and the Memorandum of Understanding between the City of Mississauga, Ontario Power Generation (OPG), and the Province of Ontario for redeveloping OPG's Lakeview site.

As the lead of Inspiration Lakeview, the City of Mississauga will provide a portfolio management role to ensure efficient and effective communications between the various Inspiration Lakeview activities, including the LWC Project. In addition, the City of Mississauga will provide an oversight role regarding public messaging of all Inspiration Lakeview Project components to ensure consistent messaging.

1.4 EA FRAMEWORK

The LWC Project has been conducted in two stages for the *EA Act* requirements. Stage one involved the development and approval of the Individual EA Terms of Reference (ToR) and the carrying out of the necessary baseline studies for the LWC Project Study Area. The purpose of the ToR was to describe how the EA would be carried out and to seek public and agency comment before proceeding. The approval of the ToR document in December 2012 by the Minister of the Environment, completed Stage one. A copy of the ToR and the letter of approval from the Minister are included in Appendix A. Stage two involves the preparation and submission for approval of the Individual EA in accordance with the EA ToR.

This EA has been prepared in accordance with the approved ToR and the requirements of subsection 6.1(2) of the *EA Act*. It generally follows the "Code of Practice: Preparing and Reviewing Environmental Assessments in Ontario" (MOE 2009a). This EA has been submitted for review and approval by the Minister of the Environment containing the following:

- Purpose of the undertaking;
- Description of the undertaking;
- Rationale for the undertaking;
- Description of the environment potentially affected directly or indirectly;
- Description and statement of rationale and assessment of 'Alternatives to' and 'Alternative Methods';

- Effects that will be caused or might reasonably be expected to be caused to the environment by the undertaking;
- The actions necessary or that may reasonably be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment;
- Advantages and disadvantages of the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking;
- A description of any consultation about the undertaking by the proponent and the results of the consultation;
- An adaptive management monitoring plan; and
- Any maps or documents as required under the *EA Act*.

Table 1.1 identifies where each of the commitments set out in the approved ToR are addressed in the EA Report.

Table 1.1 Approved Terms of Reference Commitments

Approved Terms of Reference Commitment	Where Requirement/Commitment is Addressed
1. The EA will be prepared in accordance with the requirements of subsection 6.1(2) of the *EA Act.* Section 1.2, page 1-1 of ToR	**Section 1.4 of the EA Report**
2. The EA will be prepared in accordance with such requirements as may be prescribed for the type of undertaking the proponent wishes to proceed with. Section 1.2, page 1-1 of ToR	**Section 1.5 of the EA Report**
3. The public, agencies, interest groups, and landowners will continue to be consulted during the preparation of the EA. Section 1.2, page 1-2 of ToR	**Chapter 10 of the EA Report**
4. All activities carried out during the EA will be documented in the EA Report. Section 1.2, page 1-2 of ToR	**Chapter 10 of the EA Report**
5. A detailed summary of the key background documents and how they support the problem and opportunity assessment will be included in the EA. Section 3.1, page 3-1 of ToR	**Section 2.1 of the EA Report**
6. The EA will be prepared in accordance with the requirements of this ToR and will generally follow the "Code of Practice: Preparing and Reviewing Environmental Assessments in Ontario" Section 4.1, page 4-1 of ToR	**Section 1.4 of the EA Report**

Table 1.1 Approved Terms of Reference Commitments (Cont'd)

Approved Terms of Reference Commitment	Where Requirement/Commitment is Addressed
7. The LWC Project must be coordinated with activities and other plans proceeding adjacent to it. Section 4.3, page 4-2 of ToR	**Section 2.1, Section 5.3.2.4, Section 7.3.4 and Section 7.4 of the EA Report**
8. All required federal, provincial and municipal permits and approvals will be identified as part of the EA Section 4.4, page 4-2 of ToR	**Section 1.5, Table 1.2 of the EA Report**
9. The goal and objectives will be utilized during the EA to further describe the undertaking and to structure the identification and evaluation of alternatives. Section 5.1, page 5-1 of ToR	**Section 5.3 and Section 5.4 of the EA Report**
10. Alternatives will be differentiated on the basis of how well the goal and objectives are met. Section 5.1, page 5-1 of ToR	**Section 5.4 of the EA Report**
11. The LWC Regional Study Area is a broader area in which direct and indirect effects of the LWC construction and establishment may be felt. Both study areas will be confirmed during the EA. Section 5.2, page 5-3 of ToR	**Section 2.3 of the EA Report**
12. The delivery routes for this material from highways to the LWC Project Study Area are considered part of the LWC Regional Study Area and will be defined as part of the transportation analysis. Section 5.2, page 5-4 of ToR	**Section 6.3 of the EA Report**
13. The final description and rationale for the preferred undertaking will be further developed and provided in the EA as required under the Ontario *EA Act.* Section 5.4, page 5-4 of ToR	**Chapter 6 of the EA Report**
14. Alternatives involving land creation will be carried forward to the development of 'Alternative Methods' during the EA. The 'Do Nothing' alternative will be assessed against the preferred alternative as part of the detailed assessment. Section 6.2, page 6-2 of ToR	**Chapter 4 and Chapter 5 of the EA Report**
15. LWC evaluation criteria and indicators will also assess the potential for negative environmental effects and will address all components of the environment. Section 7.0, page 7-1 of ToR	**Section 7.2, Section 7.3 and Appendix D of the EA Report**

Table 1.1 Approved Terms of Reference Commitments (Cont'd)

Approved Terms of Reference Commitment	Where Requirement/Commitment is Addressed
16. Alternative LWC Project configurations will be developed during the EA, with sub-options related to the potential realignment of Serson Creek and habitat optimization options. Section 7.0, page 7-1 of ToR	**Chapter 5 of the EA Report**
17. A range of LWC Project footprints will be determined through consideration of coastal processes, effects on water quality and the economical use of fill. Section 7.1, page 7-1 of ToR	**Section 5.1 of the EA Report**
18. A water quality model will be used to ensure that the maximum dimensions of the footprint do not cause any significant adverse effects to water quality in the vicinity of the intakes. Section 7.1, page 7-2 of ToR	**Section 7.3.3 of the EA Report**
19. Coarse level habitat creation and recreational opportunities and trail locations will be defined for each alternative such that differences between them can be assessed. Section 7.2, page 7-3 of ToR	**Section 5.2 of the EA Report**
20. The comparative evaluation will be undertaken using the preliminary evaluation criteria and indicators presented in Table 7.1. The preliminary evaluation criteria and indicators will be refined and finalized as part of the EA based on public and agency comments. Section 7.3, page 7-3 of ToR	**Section 5.3 of the EA Report**
21. For all LWC Project configurations, mitigative measures to lessen negative effects or enhance positive benefits will be identified. Section 7.3, page 7-4 of ToR	**Section 7.3, Appendix C and Appendix D of the EA Report**
22. For each indicator, each alternative LWC Project configuration will be given a qualitative score of 'least preferred', 'moderately preferred,' or 'most preferred'. Section 7.3, page 7-4 of ToR	**Section 5.3.2 of the EA Report**
23. The evaluation will result in the identification of a preferred alternative based on the evaluation criteria using a reasoned trade-off analysis which explicitly considers trade-offs between the alternatives, thereby keeping more desirable alternatives over those less desirable. Section 7.3, page 7-4 of ToR	**Section 5.3.2 of the EA Report**

Table 1.1 Approved Terms of Reference Commitments (Cont'd)

Approved Terms of Reference Commitment	Where Requirement/Commitment is Addressed
24. Public and agency input will also be sought on the alternative LWC Project configurations and the decision method. Section 7.3, page 7-4 of ToR	**Section 10.4.2, Table 10.9 and Appendix E of the EA Report**
25. The analysis by indicator will be presented in an evaluation matrix. Section 7.3, page 7-4 of ToR	**Section 5.3.2 and Appendix D of the EA Report**
26. The detailed assessment will result in a final discussion of how the preferred alternative meets the LWC Project objectives, a summary of environmental effects and mitigative measures, and an assessment of LWC Project advantages and disadvantages. Section 7.4, page 7-4 of ToR	**Section 7.3, Appendix C and Appendix D of the EA Report**
27. All aspects of the environment will be inventoried and described in more detail during the EA. Section 8.0, page 8-1 of ToR	**Chapter 3 of the EA Report**
28. A marine archaeological assessment will be undertaken in the spring/summer of 2012 as part of the EA. Section 8.3.3.2, page 8-38 of ToR	**Section 3.3.3.2 of the EA Report**
29. The following consultation mechanisms will be used to share information with the public and other stakeholders, and to seek their feedback and advice: **1) TAC (at least 3 meetings);** **2) CLC (at least 3 meetings);** **3) Public Information Centres and Working Sessions including one charette style workshop (at least 3 meetings);** **4) LWC Project Newsletters, Flyer Mail-outs & Website Updates (on-going);** **5) Newspaper Advertisements and Articles (on-going); and** **6) Coordination with Inspiration Lakeview Consultation Activities (as required).** Section 9.2.3, page 9-2 of ToR	**Chapter 10 of the EA Report**
30. A monitoring plan will be developed during the LWC EA Section 10.0 page 10-1 of ToR	**Section 8.1 of the EA Report**

1.5 OTHER APPROVALS

Other environmental authorizations and approvals that will likely need to be secured in support of the LWC Project are summarized in Table 1.2.

Table 1.2 Other Authorizations/Approvals Required for the LWC Project

Level of Government	Department/Ministry/ Municipality	Authorizations/Approvals
Federal	Fisheries and Oceans Canada (DFO)	• *Fisheries Act.* Removal of low quality aquatic habitat will be deemed a "serious harm to fish" under the new *Fisheries Act* Regulation, and may require Authorization if the effects cannot be avoided or mitigated as part of the design.
	Transport Canada (TC)	• *Navigable Waters Protection Act.* The creation of land consisting of a significant number of hectares is considered "large infilling" under the *NWPA* and will likely require a formal approval under section 5(1)(2).
	Environment Canada (EC)	• *Migratory Birds Convention Act*. A permit may be required if LWC Project activities will affect migratory birds identified under Article I of the *MBCA.*
	EC and/or DFO	• *Species at Risk Act*. A permit may be required if LWC Project activities will affect species listed on Schedule I and which contravene the *SARA*'s general or critical habitat prohibitions. Note that DFO administers the *SARA* for aquatic species while EC administers *SARA* for all other federal listed species at risk.
Provincial	Ministry of Natural Resources (MNR)	• *Public Lands Act.* The bed of Lake Ontario within the LWC Project Study Area is owned by MNR; as such, approval will be required under *PLA* for placement of fill in this area. • *Lakes and Rivers Improvement Act.* A permit under the *LRIA* will be required for construction in Lake Ontario. • *Endangered Species Act.* Permits may be required for any works within areas identified as habitat of a Species at Risk in Ontario (SARO) and for sampling SARO species. In addition, because SARO have been identified in the LWC Project Study Area, The LWC Project may require a Section 17 permit for the protection and recovery of provincial species at risk.
	TRCA and CVC	• *Conservation Authorities Act* and *Regulations 160/06* and *166/06.* Permits may be required to infill portions of Lake Ontario along the shoreline as well as for development along the shoreline and alterations to watercourses within the LWC Project Study Area. • Easement/ Permission to Enter for Arsenal Lands and Marie Curtis Park.
Municipal	City of Mississauga	• Site Plan Approval and possible heritage assessment.
	Region of Peel	• Easement for access route and Permission to Enter.
Other	OPG	• License or lease agreement with OPG may be required for use of OPG waterlots

1.6 PUBLIC AND AGENCY REVIEW OF THE DRAFT EA

The Draft EA was made available for review by the public and agencies for a from December 12th, 2013 to January 31, 2014 (while this is known as the "30-day review period" it was actually extended to account for the holiday season providing additional review time). The Draft EA was available electronically on the LWC Project website at www.creditvalleyca.ca/lwc and in hard copy at 11 locations. Additional details of this review are provided in Chapter 10 and Appendix E. Tables E9-1 (public comments) and E9-2 (agency comments) in Appendix E-9 document all comments received on the Draft EA and, if applicable, where responses can be found within the documentation. Any comments for which no response is required are noted as such.

1.7 OVERVIEW OF EA REPORT

This report is organized into 11 chapters:

Chapter 1 Introduction
Briefly describes the background, goal and objectives of the LWC Project; introduces the proponent; and provides a summary of the regulatory framework of the EA process and other approvals.

Chapter 2 Purpose of the Undertaking
Presents the Problem/Opportunity Assessment and describes the LWC Project Study Areas and timeline.

Chapter 3 Description of the Potentially Affected Environment
Describes baseline environmental and socio-economic conditions in the area.

Chapter 4 Description, Evaluation and Rationale for 'Alternatives To' the Undertaking
Describes the process through which functionally different ways of addressing the identified problem/opportunity ('Alternatives to') were developed and assessed.

Chapter 5 Description, Evaluation, and Rationale for 'Alternatives Methods' of Carrying Out the Undertaking
Describes the process through which a preferred alternative (most likely to meet the objectives of the LWC Project) was chosen.

Chapter 6 Description of the LWC Project Preferred Alternative
Provides a detailed description of the LWC Project, including its design, phasing and construction techniques.

Chapter 7 Detailed Assessment of the Preferred Alternative
Presents the criteria, indicators, and results of the detailed assessment of environmental effects, including an outline of mitigation measures, net effects, and a summary of effects by LWC Project objectives.

Chapter 8 Monitoring and Adaptive Environmental Management
Outlines the framework, strategy and activities of the monitoring and adaptive environmental management that will be conducted throughout the LWC Project's lifespan.

Chapter 9 EA Amendment Process
Provides a framework to deal with modifications to the LWC Project after the completion of the EA.

Chapter 10 Consultation
Describes the public, agency and Aboriginal consultation program including input from various interested parties and the proponent's responses.

Chapter 11 Advantages and Disadvantages
Summarizes the advantages and disadvantages of the LWC Project from an environmental and socio-economic standpoint.

Chapter 12 References

2.0 PURPOSE OF THE UNDERTAKING

Chapter 2 provides a description of the purpose of the LWC Project. The description is framed in terms of both the problem (an ecologically degraded and disconnected area of waterfront) and the opportunity (creating aquatic and terrestrial habitats including naturalization of shoreline and creeks and providing for public access to and along the waterfront) that the LWC Project presents. Thus, the goal/purpose of the LWC Project is to "create a new natural waterfront park that will establish ecological habitat and public linkages on the eastern Mississauga Waterfront". The reference to a "natural waterfront park" alludes to the focus on re-establishing wetlands, meadows, beaches, streams and forest habitats while providing for passive recreation opportunities that will allow the public to enjoy these features.

2.1 PROBLEM/OPPORTUNITY ASSESSMENT

There is a long history of planning, public engagement and scientific studies with respect to the eastern Mississauga waterfront. A number of documents describing issues and opportunities along the Lake Ontario shoreline and nearshore areas have been developed for Mississauga, Toronto and Lake Ontario as a whole, and are applicable to the LWC Project. These documents are listed in Table 2.1 and some of the key studies are discussed in Section 2.1.1, Sections 2.1.2 and 2.1.3 to provide a more detailed description of the problems and opportunities associated with the existing habitat and public access, respectively.

Table 2.1 List of Background Studies

Title	Year	Author(s)
Arsenal Lands Master Plan Addendum (including Marie Curtis Park West)	2007	Toronto and Region Conservation Authority, City of Toronto, City of Mississauga, Region of Peel
City of Mississauga Lakeview Legacy Project	2008	Lakeview Ratepayers Association
Marie Curtis Park Revitalization Plan	2009	City of Toronto
Conservation Lands Management Manual: Policies, Procedures and Programs for Managing CVC Lands	no date	Credit Valley Conservation
Credit River Watershed Natural Heritage Strategy	underway	Credit Valley Conservation
Fill Quality Guide and Good Management Practices for Shore Infilling in Ontario	2011	Ontario Ministry of the Environment
Fish Community Objectives for Lake Ontario	2013	Great Lakes Fishery Commission
Future Directions: Implementation Guide for Recreation	2009	City of Mississauga
Future Directions: Master Plan for Parks and Natural Areas	2009	Envision; Mehak, Kelly & Associates; and Natural Resource Solutions Inc. for Community Services Department, City of Mississauga

Table 2.1 List of Background Studies (Cont'd)

Title	Year	Author(s)
Greater Toronto and Area Waterfront: An Urban Recreational Fisheries Plan	Underway	MNR, Central Lake Ontario Conservation Authority, Ganaraska Conservation Authority, Credit Valley Conservation, Toronto and Region Conservation
Inspiration Lakeview: A Vision	2011	Urban Strategies Inc. for City of Mississauga
Inspiration Lakeview: Phase I Background Report	2010	Urban Strategies Inc.; GHD Inc.; and N. Barry Lyon Consultants Inc. for City of Mississauga
Inspiration Port Credit Background Report	2013	Stoss Landscape Urbanism; Dillon Consulting Limited; Sweeny Sterling Finlayson & Co. Architects, Inc.; Woods Hole Group; James Lima Planning & Development; and Soil-Mat Engineers & Consultants Ltd. for City of Mississauga
Integrated Shoreline Management Plan	1996	Fenco MacLaren Inc.; Shoreplan Engineering Ltd.; EDA Collaborative Inc.; Tarandus Associates Ltd.; and Ecorp Inc. for Metropolitan Toronto and Region Conservation Authority
Lake Ontario Integrated Shoreline Study: Background Review and Data Gap Analysis	2011	Credit Valley Conservation
Lake Ontario Waterfront Development Program	1980	Toronto and Region Conservation Authority
Lakeview Waterfront Connection Feasibility Study	2011	Credit Valley Conservation and Toronto and Region Conservation Authority
Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study	2009	North-South Environmental Inc., Dougan & Associates and Sorensen Gravely Lowes
Port Credit Harbour West Parks Engineering Studies and Environmental Assessment	Currently underway	City of Mississauga
Regeneration: Toronto's Waterfront and Sustainable City	1991	Royal Commission on the Future of the Toronto Waterfront (Canada), David Crombie
Terrestrial Ecosystem Enhancement Model (TEEM), Landscape Scale Analysis of the City of Mississauga: Natural and Semi-Natural Habitats and Opportunities for Enhancement	2012	Credit Valley Conservation
The Beautiful Lake: A Binational Biodiversity Conservation Strategy for Lake Ontario	2009	Lake Ontario Biodiversity Strategy Working Group with US – Canada Lake Ontario Lake-wide Management Plan
Toronto Beaches Plan	2009	City of Toronto
Toronto Waterfront Aquatic Habitat Restoration Strategy	2007	Aquatic Habitat Toronto for Waterfront Toronto
Waterfront Parks Strategy	2008	Brook McIlroy Inc. / Pace Architects for City of Mississauga
Wetlands Restoration Strategy	2009	Credit Valley Conservation

2.1.1 Key Studies and Plans

2.1.1.1 Inspiration Lakeview

Inspiration Lakeview (April 2011) resulted from a collaboration between the City of Mississauga, agencies and the broader public. It provides a new vision to transform the eastern Mississauga waterfront based on four Key Moves organized around the themes of Blue (water), Green (park and natural spaces), Culture (heritage) and Urban (elements) and eight key principles. The eight principles are:

1. Link the City and the Water – this principle emphasizes the desire to allow people to interact with Lake Ontario by bringing the City of Mississauga to the water's edge.
2. Open the Site with a Wealth of Accessible Public Spaces – this principle expresses the desire that the waterfront be open to the public to gather and experience Lake Ontario.
3. Create a Green, Sustainable, Innovative, Model New Community – this principle promotes future development to be innovative and more environmentally friendly.
4. Create a Vibrant Community – this principle expresses the desire that the community created by Inspiration Lakeview be diverse and welcoming, allowing for opportunities for employment, housing and cultural and educational institutions.
5. Connect in Multiple Ways: Transit, Walking, Cycling and the Car – this principle points out the extensive size encompassing the Inspiration Lakeview lands and expresses the desire for access to be by more than private automobile including by walking, cycling and transit.
6. Create a Destination to Draw Local, Regional and International Visitors – this principle expresses the desire for Inspiration Lakeview to include programs, uses and attractions that will draw visitors from local, regional and international destinations.
7. Commemorate History While Creating a New Legacy – this principle expresses the desire that Inspiration Lakeview celebrate and commemorate the history of the lands.
8. Balance Public and Private Investment to be Economically Viable and Sustainable – this principle recognizes that the vision for Inspiration Lakeview will take significant resources that must balance site redevelopment with fiscal responsibility.

Specifically, the Inspiration Lakeview vision includes A Green Water's Edge: *"…a new green water's edge could be created south of the waste water treatment plant connecting the Arsenal Lands and Marie Curtis Park to the eastern breakwall and the Green Corridor. This new lakefront land also provides new natural heritage and habitat opportunities, including opportunities to improve marine habitat….*" This Green Water's Edge allows for the relocation of the Waterfront Trail from Lakeshore Road to Lake Ontario shoreline.

The vision also includes A Green Corridor linking the Green Water's Edge to Lakeshore to the west of the WWTF. This corridor envisions more active recreation, a naturalized and daylighted Serson Creek, and clear views to the lake and eastern pier. Figure 2.1 illustrates the Vision for Inspiration Lakeview.

The LWC Project has components of all eight Inspiration Lakeview principles and is a key step in implementing Inspiration Lakeview because it represents one of the "Big Green Moves" – creating the Green Water's Edge. This will effectively provide public and ecological connection between OPG's Lakeview site and existing Marie Curtis Park.

2.1.1.2 Lake Ontario Integrated Shoreline Strategy

The LWC Project has been developed in parallel with CVC's LOISS. The LOISS is a multi-year, multidiscipline program intended to:

- collect and analyze information on the Lake Ontario shoreline within the CVC jurisdiction;
- characterize the shoreline and identify opportunities for the protection and restoration of natural ecosystems along the shoreline, inland, and into the lake in the nearshore environment; and
- develop a Shoreline Restoration Plan.

The LOISS is also aimed at complementing the City of Mississauga's Waterfront Parks Management Strategy in its upcoming updates and future parkland redevelopment.

LOISS seeks to identify the role of existing features in meeting the needs of wildlife, but also to identify priority areas for both restoration and creation of aquatic and terrestrial habitat to enhance existing features and functions. Implementation of the LWC Project will contribute directly to improvements in aquatic and terrestrial habitat and functions within the LOISS project area. In addition, the LWC Project has utilized some of the information collected and analyzed as part of the LOISS to describe the existing environment in the LWC Project Study Area.

Figure 2.1 Inspiration Lakeview The Vision Map 3: Big Green Moves

Source: City of Mississauga, 2011

2.1.1.3 Fish Community Objectives for Lake Ontario

Recently, the Great Lakes Fishery Commission released the Fish Community Objectives for Lake Ontario (2013) which lists targets of softer shorelines and creation of coastal wetlands to maintain and increase target fish species in the nearshore. The document also identifies broad targets and indicators for the fish community of Lake Ontario including:

1. Maintaining, enhancing and restoring self-sustaining Walleye, Yellow Perch, Northern Pike, and Bass fisheries, populations and recruitment in the nearshore.
2. Maintaining, restoring and increasing the richness and diversity of native fish species in nearshore areas and embayments.
3. Maintaining or increasing populations and increasing species diversity of pelagic prey fish including introduced species (Alewife, Rainbow Smelt) and selected native prey fish species (Threespine Stickleback, Emerald Shiner, Lake Cisco).

These broad targets and indicators have been considered throughout the LWC EA process. The activities contemplated in the LWC Project are consistent with many of the targets and indicators presented in the Fish Community Objectives for Lake Ontario.

2.1.1.4 Lakeview Waterfront Connection Feasibility Study

Beginning in the spring of 2010 and culminating in the November 2011 report *Lakeview Waterfront Connection Feasibility Study* (CVC and TRCA, 2011), the Region of Peel initiated a Feasibility Study to examine the potential for fill generated in the Region of Peel to be used to create new lands that would:

- Create coastal and terrestrial habitat;
- Improve waterfront connectivity for both the public and ecology; and
- Provide an opportunity for the sustainable reuse of fill.

The Feasibility Study contemplated a proposed project for the fill that is nearly the same as that proposed in the current LWC Project. Key findings from the Feasibility Study included:

- Cost savings are possible if fill haul sites are located more than 120 minutes from the fill source;
- Hauling fill to the proposed land creation site (the current LWC Project site) will result in reductions to both greenhouse gas emissions and haul travel distance;
- The proposal project land creation has the potential to create and enhance aquatic habitat;
- The proposed project has the potential to enhance the quality of terrestrial habitat;

- The proposed project is expected to utilize some of the nutrient loading into Lake Ontario by encouraging the growth of macrophytes;
- Public access and use of the waterfront in the area of the proposed project will improve;
- Waterlot costs are identified as unknown and pose a risk to the proposed project;
- Groundwater quality and remediation needs are identified as a potential risk to the proposed project;
- Construction phasing for the proposed project with the naturalization and alignment of Serson Creek will require consideration;
- Timing of approval with construction and fill stockpiling poses a potential financial risk to the proposed project;
- The discovery of a previously undocumented linear submerged boulder field offshore near the WWTF will require the review of a marine archaeologist;
- Maintenance and operation of the new park following completion of the proposed project requires review;
- The infrastructure and operation of existing Region of Peel facilities co-located with the proposed project must be taken into account;
- Changes in the outflow of creeks co-located with the proposed project must be assessed for a net benefit to condition; and
- Consultation and public and stakeholder engagement must maintain support for the proposed project.

All of the key considerations identified in the Feasibility Study have been considered as part of the EA process and addressed directly in this EA Report.

2.1.2 Project Goal Element: Establish Ecological Habitat

2.1.2.1 Key Problems

Land use changes along the shoreline of Eastern Mississauga have generally compromised the quality of terrestrial and aquatic habitat. The removal of stone, industrial use and proximity to urban areas have left the area with a legacy of degraded habitat quality and quantity.

The historic/past mining of sand, gravel, stone and blocks of shale from the nearshore of Lake Ontario, known as “stonehooking”, has left a legacy along the Mississauga shoreline that has resulted in whole scale changes in, and destruction of, nearshore habitat. These changes resulted in the removal of structure and shelter for fish including the now extinct Lake Ontario population of Atlantic Salmon (Martin 2007). The loss of virtually all cobble substrates and the elimination of Lake Trout spawning reefs are also attributed to stonehooking (Whillans 1979). CVC has

estimated that as much as 4 million tonnes of material may have been removed from the shoreline within the LOISS study area as part of stonehooking (CVC unpublished).

The massive amounts of stone that were removed from the Lake Ontario nearshore by stonehookers during the 19th century destroyed spawning grounds and caused accelerated rates of erosion by removing stones that help to dissipate wave energy and provide natural stabilization of the shoreline. Changes to the shoreline through the construction of piers, infilling, changes in sedimentation and other factors related to stonehooking also opened up the habitat to be exploited by other fish communities (Ford 2009). Recent fish surveys along the nearshore area at Lakeview have found only a few occurrences of Alewife and Emerald Shiner, both offshore pelagic fish species.

Between OPG's eastern pier and the west side of Etobicoke Creek, approximately 55% of the shoreline is artificial using either revetments consisting of armourstone or riprap, or breakwaters consisting of armourstone or concrete reinforced submerged barges. The existing artificial shorelines were designed to protect the infilled shoreline and industrial land uses fronting the lake. These shorelines were designed specifically to protect infrastructure and were constructed with little thought for habitat related purposes. Roughly 24 ha of lakefill has occurred since 1945 associated with OPG's Lakeview site and the Region of Peel's WWTF in order to allow for expansion of their respective industrial operations. While some natural shoreline remains in the area near the LWC Project (the sandy beaches at Marie Curtis Park and a remnant beach immediately south of the WWTF), the general ability of the area to support a diverse aquatic community is impaired by past and current use and the implementation of artificial shorelines.

The long history of industrial use in the area has led to a wide range of possible historical and current sources of contamination to Lake Ontario through groundwater and surface flows, and operations. In addition, Etobicoke Creek is a highly urbanized watershed that drains into the eastern edge of the City of Mississauga, carrying a wide-range of contaminants, sediment and debris. A number of smaller urban watersheds drain into the water immediately to the west. High nutrient and bacteria loads are routinely found in local waters and frequently resulting in extensive algae blooms and bad odours. The existing beaches are also routinely covered with debris that has been washed into the Lake from nearby streams and outfalls during storm events. The natural ability of the area to mitigate water quality and stormwater has been further compromised through large scale losses in natural heritage features and functions including: a large coastal wetland that once connected the mouths of Etobicoke, Serson and Applewood Creeks and forest habitat.

As a result of these activities and conditions, the majority of the shoreline and nearshore area has been degraded and offers only low quality fish habitat. In addition, only small areas of natural terrestrial habitat cover remains and what is left is primarily limited to the eastern end of the WWTF lands, and in Marie Curtis Park and the Arsenal Lands. The presence of both invasive aquatic and terrestrial species in the area near the LWC Project has led to the simplification of food webs. Despite the dearth of natural habitat conditions and degraded food webs in the area, regular bird sightings along the waterfront and on the south shore of the WWTF indicate usage by a wide range of migrating species. Due to the degradation and loss of natural wetlands, many of these birds use ash lagoons at the WWTF as surrogate habitat.

2.1.2.2 Project Opportunities

The LWC Project intends to naturalize the shoreline and create public linkages to the south of the existing WWTF. This will require a new shoreline along its southern limits. This shoreline will seek to transform the existing poorly functioning shoreline, currently consisting primarily of construction rubble and armourstone, into a more natural and dynamic system. Similar shoreline restoration projects, such as Port Union in Scarborough, resulted in 10 and 100 fold increases in pelagic fish populations (e.g., Emerald Shiners) along the coast. Further, the LWC Project envisions the creation of new coastal wetlands that will be fed by Serson and Applewood Creeks and controlled by lake levels. These wetlands will recreate important habitats for fish, birds and herpetofauna that have been missing from this part of the Mississauga waterfront since the 1950s and 60s. It is anticipated that fish populations located in Etobicoke Creek, Credit River, Lakefront Promenade Park, Rattray Marsh, Credit River Marshes Humber River and the nearby embayments will quickly colonize any coastal habitat established in the LWC Project area. It will also provide an important stepping stone for fish and bird movements along the Mississauga shore. Wetlands, streams and beaches will be designed with consideration for climate change impacts as well.

The LWC Project is not only intended to provide beach and wetland habitat, but will establish an appropriate mix of coastal terrestrial habitats (i.e., meadows and treed areas) to allow for a more robust mix of habitats for birds and small wildlife. This is intended to improve the function that the area near the LWC Project already provides by improving the quality and quantity of terrestrial habitat for stop-over, reproduction and foraging purposes.

Ultimately, the LWC Project has the potential to establish and enhance a wide range of aquatic, nearshore and terrestrial habitat conditions between OPG's Lakeview site and the western sand beaches of Marie Curtis Park.

2.1.3 Project Goal Element: Create Public Linkages

2.1.3.1 Key Problems

Although Marie Curtis Park allows public access to the Lake Ontario waterfront, public access west of the park is impeded by security restrictions associated with industrial activities at both OPG's former Lakeview Generating Station and the Region of Peel's WWTF.

The Waterfront Trail currently connects Marie Curtis Park to Lakeview Park (north of OPG's Lakeview site). However, due to security restrictions, the trail bypasses the waterfront and is forced north along Lakeshore Road East for a 650-m long stretch between Hydro Road and the Arsenal Lands. A spur trail connects the Waterfront Trail with Lakefront Promenade west of OPG's Lakeview site. To the east the Waterfront Trail travels south of the Arsenal Lands and then through Marie Curtis Park. With trail and public access diverted away from most of the waterfront, inappropriate and illegal uses can be found in the more isolated portions of the waterfront parks, particularly along the western parking lot and beaches of Marie Curtis Park, and along the southern fence line of the WWTF. OPG provides licenses to the City of Mississauga for the Waterfront Trail and adjacent parklands north of the former Lakeview site.

The disruption in connectivity and public access is a major barrier to trail connections and continuous public enjoyment of the Lake Ontario waterfront through this eastern part of Mississauga to the City of Toronto. This issue was also identified in the City of Mississauga's Waterfront Parks Strategy; Future Directions: Implementation Guide for Recreation; and, Future Directions: Master Plan for Parks and Natural Areas.

In addition to limited access and connectivity, the quality of terrestrial and marine recreation opportunities along the LWC Project portion of the waterfront are impaired and/or limited. Currently, the sand beaches at Marie Curtis Park are regularly covered with large volumes of debris and the waters are regularly deemed unsafe for bathing due to high *E. Coli* levels (among the highest levels of all the Toronto beaches). Debris and water quality impairments are attributed, in part, to the proximity of the beach to urban creeks and rivers. Out of Toronto's eleven public beaches, Marie Curtis Park is one of three beaches that does not qualify for Blue Flag Beach status[1].

[1] A certification indicating that a beach meets high environmental and quality standards (see http://www.blueflag.org/)

2.1.3.2 Project Opportunities

The creation of a new waterfront park has the potential to provide north-south connections for people from Lakeshore Road to the waterfront, and east-west connections between existing waterfront parks using a series of recreational trails, including the relocation of the Waterfront Trail to the waterfront. While the LWC Project alone will not resolve water quality impairments and debris loadings from local and regional sources, the creation of new beaches further from the mouths of some of these sources, may provide alternative, cleaner beach areas for use by the public.

2.2 FUNDING OPPORTUNITIES

Waterfront projects that enhance public access and shoreline ecology, like the LWC Project, are traditionally funded through the capital budgets of municipalities or conservation authorities. Within the municipal budget process these projects compete for available funding with other projects that are generally considered to be of higher importance to the broader community. As such, in general, water and sewer infrastructure, emergency services, roads, transit and waste management activities tend to receive capital funding over waterfront projects that are perceived to have softer benefits to the community. Thus, many waterfront projects are not built until alternative sources of funding can be accessed.

Alternative funding sources have historically been associated with federal or provincial economic development programs that are often created as catalysts for job creation. These programs are typically limited in funding availability and accessibility as well as scope of applicability and timing.

Ever mindful of financial realities facing the public sector and the competition for public capital budgets, the co-proponents together with the City of Mississauga are nevertheless seeking to achieve the Inspiration Lakeview vision for the waterfront. To this end, the Region of Peel engaged CVC and TRCA in 2011 to undertake the feasibility study for the LWC Project. Specifically, they sought a source of funding that would seek to use a resource and offset costs from infrastructure projects to fund the LWC Project. Such an approach could extend the value of public money. The study concluded in 2011 that based on a number of assumptions, the LWC Project could be implemented close to revenue neutral conditions. The study also identified that a number of risk elements would need resolution during a formal EA planning process.

Currently, the Regional and Municipal governments have long-term plans for infrastructure works that are anticipated to generate significant volumes of clean fill. This clean fill, which is likely to consist of glacial till and shale bedrock, would typically be treated as waste and hauled

long-distances for disposal. Instead, there is an opportunity to use this material as a resource to meet the naturalization and public access objectives. In addition, the offset costs from the reduced haulage could be used to help fund the planning and implementation for the new natural waterfront park. The LWC Project represents an opportunity to put what are typically considered waste materials to better local use and apply the saved Regional funds for additional environmental and public benefit. Furthermore, by using this fill locally, the Regional Municipality of Peel would divert these materials from the waste management stream currently going to rural communities, thus further reducing the negative environmental and social impacts in other municipalities.

There is extensive evidence of significant negative environmental, social and economic impacts and growing public discontent in the rural areas that receive fill materials. Robert Messervey, Chief Administrative Officer of the Kawartha Conservation Authority, presented case studies of the negative impacts of large-scale commercial fill operations throughout their jurisdiction at a workshop held by the Ontario Professional Planners Institute (June 20, 2013). Issues frequently associated with commercial fill operations include:

- Lack of public consultation prior to site establishment and start of operations;
- Operations proceeding without proper environmental, socioeconomic studies;
- Operations proceeding without proper permits, including direct non-compliance of township bylaws;
- Heavy truck traffic use on smaller rural roads and highways (hundreds of trucks per day);
- Dust and noise emissions in rural areas;
- Proximity and quantity of fill to adjacent properties reduces property values and raises public safety concerns;
- Concerns about contamination to soils and groundwater; and
- Transformation of greenspace agricultural and environmentally sensitive lands.

The Region of Peel is continually investing in its public works infrastructure. As a result of these infrastructure projects, the Region of Peel anticipates that approximately 1 to 2 million cubic metres (m^3) of clean fill would be generated over a 10 year period. This fill, which would normally be trucked directly to a rural disposal site, could be beneficially reused in the LWC Project to create habitats and public linkages.

Based on estimates in the Feasibility Study, the Region of Peel and the City of Mississauga are facing disposal costs in the range of $38,000,000 to $50,000,000 for fill generated as part of capital infrastructure projects. Funding the disposal of the clean fill provides no additional benefit to either the community or the environment. If a beneficial use for the fill could be found closer to sites generating fill, the cost savings associated with reduced haulage rates could be

redirected to fund the planning and construction of the new natural habitats and public linkages proposed by the LWC Project.

In the event that supply rates during construction of the LWC Project are lower than anticipated from the Region of Peel and City of Mississauga, materials and their associated tipping fees may be accepted from local private developers to enable construction of the LWC Project to proceed in a timely manner.

2.3 STUDY AREAS

Two specific study areas have been defined for the LWC Project. The LWC Regional Study Area is a broad area in which direct and indirect effects of the LWC construction and establishment may appear. The LWC Project Study Area is the area identified to create ecological habitat and public linkages.

The LWC Regional Study Area and LWC Project Study Area as described in Sections 2.3.1 and 2.3.2, respectively, are general. Where appropriate, each technical discipline may alter the study areas to better identify and assess effects and benefits. Modifications are described in the appropriate Sections of Chapters 3 and 7.

2.3.1 LWC Regional Study Area

The LWC Regional Study Area extends from the western-most extent of CVC's jurisdictional boundaries on the border with Oakville, into TRCA's jurisdiction as far east as Colonel Samuel Smith Park in the City of Toronto. The northern-most limit of the LWC Regional Study Area roughly coincides with the Queen Elizabeth Way, but ranges from about 2.5 to 3.0 km inland, and about 1 km offshore (Figure 2.2). The LWC Regional Study Area coincides with the broader shoreline area defined by CVC's LOISS.

The general area from which the fill material is being sourced is not being included in the LWC Regional Study Area as the effects of moving fill materials away from these sites was (or will be) assessed as part of project-specific EAs where applicable. The delivery routes for this material from highways to the LWC Project Study Area are considered part of the LWC Regional Study Area and will be defined as part of the transportation analysis.

2.3.2 LWC Project Study Area

The LWC Project Study Area is bounded to the east by Etobicoke Creek, to the west by Serson Creek and the eastern OPG pier, and to the north by Lakeshore Road. The LWC Project Study Area extends approximately 1 km south into Lake Ontario (Figure 2.3). In the east, the LWC Project Study Area includes Marie Curtis Park West and the Arsenal Lands, which are owned by TRCA (Figure 2.4). Marie Curtis Park is managed and operated by the City of Toronto. Region of Peel's WWTF, occupies much of the LWC Project Study Area. The long, linear waterlots extending into Lake Ontario indicate the location for critical outfalls for the WWTF. Except where otherwise indicated, Lake Ontario within the LWC Project Study Area is considered unalienated Crown land which has not been surveyed into waterlots.

OPG is currently undergoing an evaluation process to determine the future uses of its lands and waterlots, as part of a Memorandum of Understanding with the City of Mississauga and Province of Ontario to develop a shared vision for OPG's Lakeview site. This process is anticipated to conclude in June 2014. Therefore, the LWC Project cannot consider the use of OPG property. Should the opportunity arise to consider the use of the OPG land prior to June 2014, the LWC Project Study Area could be extended to include them.

Figure 2.2 LWC Regional Study Area

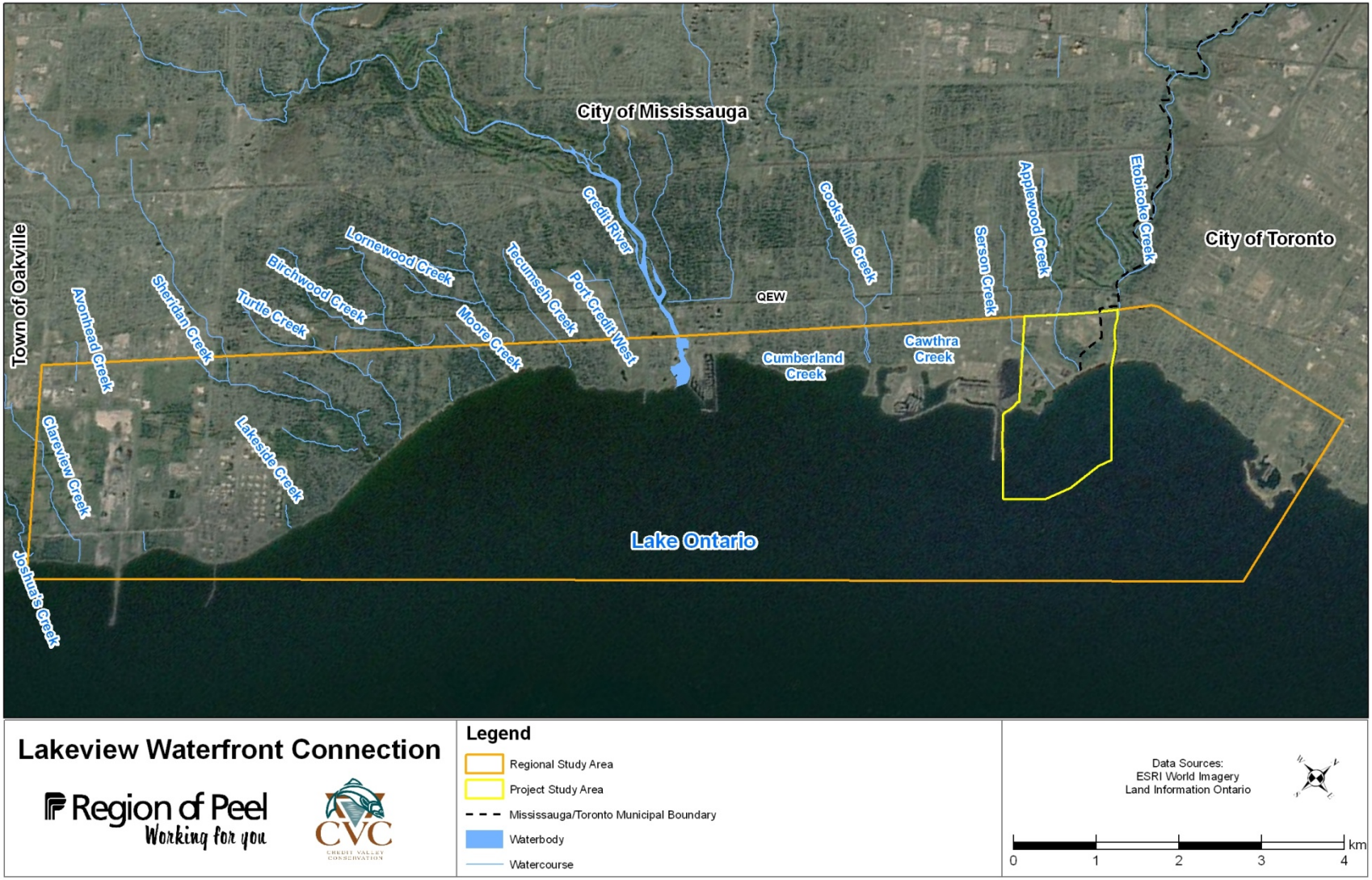


Figure 2.3 LWC Project Study Area

Figure 2.4 Land Ownership within the LWC Project Study Area

2.4 PROJECT SCHEDULE

The Temporal Boundaries for the LWC Project which will be used as the basis for the effects assessment are as follows:

- Detailed Design, Permit Approvals and Land Acquisition (2014) assuming EA approval in mid-2014.
- Construction/Implementation – 7 to 10 years (target start date 2015).
- Establishment – defined as the timeframe for monitoring and adaptive management of the LWC Project (approximately the first 15 years after construction).
- Post-Establishment Monitoring – timeframe for monitoring and operational management (fish habitats, terrestrial habitats and trails) to identify further intervention if naturalized system is not self-maintaining (onwards from the establishment phase for the lifecycle of the LWC Project).

3.0 DESCRIPTION OF THE POTENTIALLY AFFECTED ENVIRONMENT

The purpose of Chapter 3 is to present an overview of the environment potentially affected by the proposed LWC Project. This will create familiarity with issues to be addressed and the complexity of the environment likely to be affected by the LWC Project. All aspects of the environment within the LWC Regional and Project Study Areas (see Figures 3.1 and 3.2) have been described in this chapter. The chapter is divided into three sections which capture different components of the environment. The first section describes the coastal and fluvial characteristics, including aquatic habitat, which will influence the development of 'Alternative Methods'. This information has been separated from the remaining description of the natural environment so that emphasis can be given to those aspects of the existing environment that are driving the LWC Project. The second section describes the remaining components of the natural environment: terrestrial vegetation and wildlife, and soils and geology. The third section describes socioeconomic components: existing and planned land use, land ownership, archaeology, cultural heritage, recreation and Aboriginal interests.

The description of the existing environment is primarily based on the information from two existing studies including the Feasibility Study (CVC and TRCA, 2012), and reports prepared for CVC's LOISS (Aquafor Beech, 2011a; 2011b). Additional field studies were undertaken where appropriate. Other documents and studies used in the preparation of the information are referenced in the appropriate sections.

3.1 SHORELINE & RIVER PROCESSES & CONDITIONS

3.1.1 Geomorphology

Geomorphology is the study of the composition and configuration of landforms, the forces acting upon them (e.g. streamflow, wind, wave), and the physical response of landforms to those processes (e.g. erosion, deposition). These dynamic process-response systems have an impact on terrestrial and aquatic habitat, infrastructure, water quality, recreation, and many other components of the environment. In the context of the LWC Project, an understanding of baseline geomorphology is critical to designing a stable, functional and sustainable landform and aquatic system.

3.1.1.1 Shoreline Processes & Conditions

Current shoreline conditions within the LWC Regional and Project Study Areas are a function of natural coastal process and modifications that have occurred over time as the area has been urbanized. Baseline shoreline conditions provide insight into potential shoreline configurations that will be proposed as LWC Project 'Alternative Methods'.

LWC Regional Study Area

Within the City of Mississauga city, approximately 80% of the shoreline has been modified (LOISS 2011). The City of Toronto portion of the LWC Regional Study Area consists of approximately 175 m of sand beach shoreline on the east side of Etobicoke Creek plus approximately 3,100 m of artificial shoreline, including the headlands at Colonel Samuel Smith Park (see Figure 3.1).

The nearshore bottom within the LWC Regional Study Area is composed mainly of shale bedrock, overlain with erodible cohesive tills varying from low plains to low and moderate height bluffs. Extensive filling has created a number of reaches that are characterized as artificial shores (LOISS 2011).

Examples of artificial and natural beaches (sand and cobble) within the LWC Regional Study Area are found at Rattray Marsh, Lakeside Park (artificial clay cobble) and Fusion Park; and sand beaches at Richard's Memorial Park, Lorne Park Estates, Jack Darling Park, Suncor Energy and on either side of the mouth of Etobicoke Creek. Strictly speaking the beaches on either side of the mouth of Etobicoke Creek, within Marie Curtis Park (East and West) are naturally a sand/gravel beach. The City of Toronto has had to nourish Marie Curtis Park beach on an as needed basis and not as part of routine maintenance operations, primarily focused on the east side of Etobicoke Creek. In response to recent storm events and to ensure safety and to provide access for permitted uses such as volleyball, beach nourishment is now occurring (on an as needed basis) on the west side of Etobicoke Creek as well.

LWC Project Study Area

Within the LWC Project Study Area (see Figure 3.2), approximately 55% of the shoreline is hardened, with the remaining 45% being thin sandy beaches. Historic lakefilling that has occurred in front of the WWTF's ash lagoons are examples of hardened shores (revetment). The sand beach between those two sections of artificial shore is a remnant of previous lakefilling and is a thin sand deposit overlying the cohesive shore and bedrock substrate. The beach fronting Marie Curtis Park is natural and is backed by a low cohesive plain and overlays a bedrock substrate. The length of sand beach fronting Marie Curtis Park west of Etobicoke Creek is 505 m.

The mouth of Etobicoke Creek was redirected and piers were installed between 1946 and 1954 which fixed the creek mouth in its current location and created a partial barrier to long shore sediment transport. Air photo analysis indicates that shoreline recession rates have been stabilized since 1978 (Geomorphic Solutions, 2012). Given these stable conditions, the beach no longer meets the province's definition for classification as a dynamic beach[2] (GHD 2013).

[2] Beach material is moved over time by shoreline erosional processes.

Figure 3.1 Features within the LWC Regional Study Area

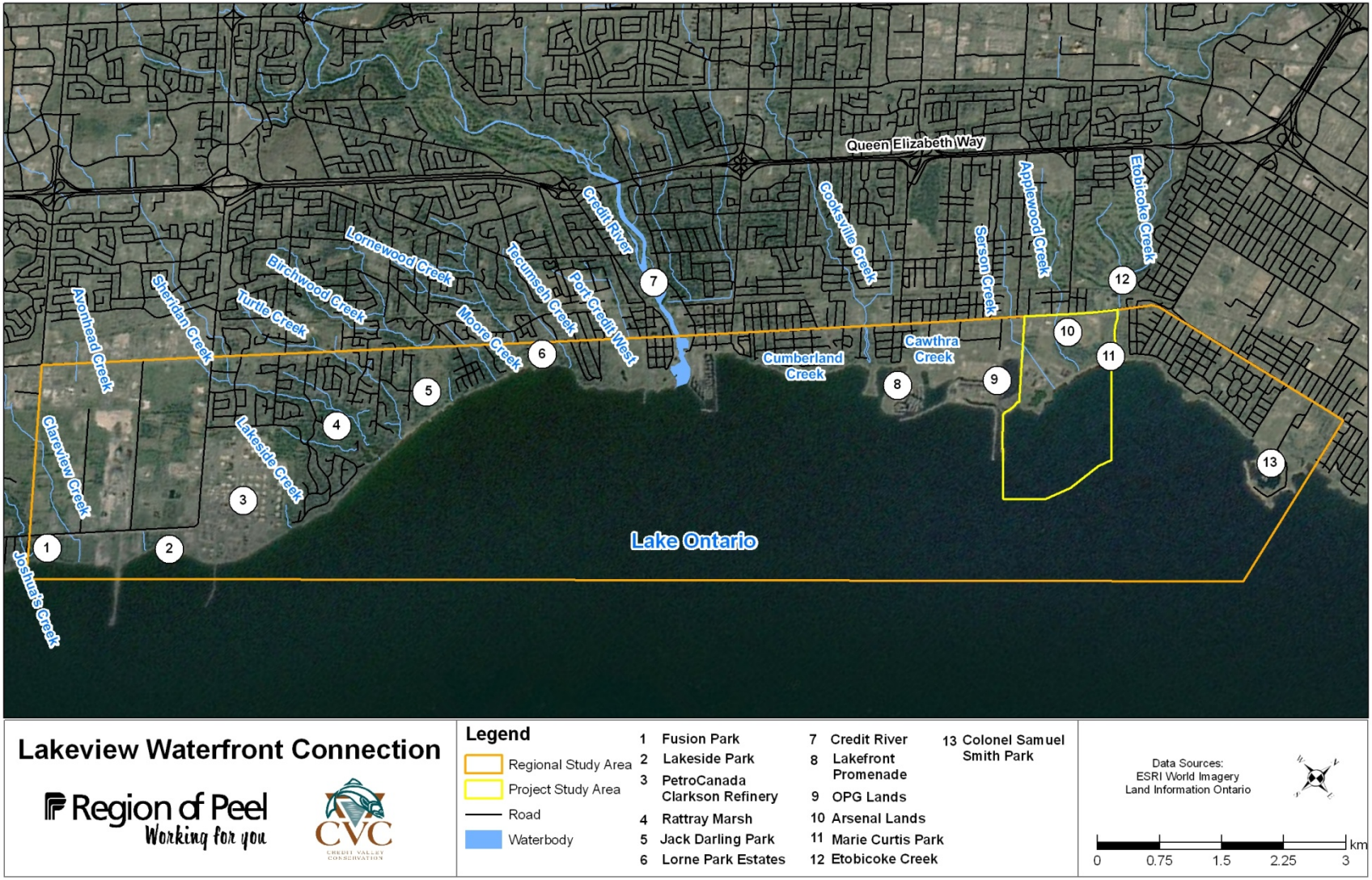


Figure 3.2 Features within the LWC Project Study Area

3.1.1.2 River Processes & Conditions

Creeks provide hydraulic, organic and sediment inputs to natural features such as wetlands and will inform the potential locations of wetland features that are created as part of the LWC Project. Baseline creek conditions will also inform the design of new reaches through the LWC Project footprint. Understanding historical and contemporary trends in creek morphology will be used in the generation of LWC 'Alternative Methods' and the detailed assessment of the Preferred Alternative.

LWC Regional Study Area

Creeks within the LWC Regional Study Area vary in size from small catchments with headwaters just north of the QEW (e.g. Applewood and Serson) to large systems with catchments extending to northern parts of the Region of Peel (e.g. Credit River, Etobicoke and Cooksville). The drainage areas of the lower Credit River and the smaller Lake Ontario tributaries are primarily urban land use with some woodlots and open spaces (golf courses, hydro corridors, etc.). Depending on their geographic extent, these creeks flow over/through glacial till, glaciolacustrine sands, alluvial (river) deposits, and soft bedrock of the Queenston Shale. The impervious surfaces of urban systems coupled with storm drainage create flash flood responses of greater magnitude in comparison to more natural systems. These floods pass through these creeks rapidly, posing potential hazards from flooding, erosion and deposition.

LWC Project Study Area

The LWC Project Study Area contains two creeks, Applewood and Serson (Figure 3.2). These creeks have small drainage basins extending from south of the QEW and form part of CVC's Lake Ontario East Shoreline Subwatershed. The lower portions of the creeks flow southeast between Lakeshore Road and Lake Ontario. As part of the LWC Project, the creeks will be extended from the existing shoreline to a proposed shoreline. The extension will be roughly 200 m into Lake Ontario, which is expected to be integrated into the waterfront design with the creeks' natural integrity.

Serson and Applewood Creeks are located in urbanized watersheds with large areas of impervious surfaces, meaning that the creeks respond rapidly to rainfall events (CVC & TRCA, 2012). Generally speaking, the area downstream of Lakeshore Road is considered to be a depositional zone due to a combination of backwater effects from Lake Ontario and shallow channel gradients; however, sediment accumulations may be removed under erosive flow conditions when lake levels are low (CVC & TRCA, 2012).

Serson Creek

The small Serson Creek watershed drains 270 ha (CVC & TRCA, 2012). Baseflows from Serson Creek currently travel through a wooded, open channel north of the WWTF, before being diverted underneath the WWTF and through a culvert to Lake Ontario. During storm events, flood flows are split between the baseflow culvert and a straight, stormwater channel located between the WWTF and OPG's Lakeview site. The current flow splitting conditions impairs ecological functions within the westerly flood conveyance channel and precludes any ability to establish a functioning coastal wetland at the mouth of Serson Creek (CVC & TRCA, 2012). Fieldwork undertaken in 2011 confirmed interaction between Serson Creek and Lake Ontario to be minimal (Aquafor Beech, 2011a).

An erosion assessment conducted for the flood conveyance channel of Serson Creek to the west of the WWTF included a field survey and detailed description of the channel (AECOM, 2008). The assessment noted that Serson Creek has undergone various changes in alignment since at least 1954 (the earliest aerial photographs available). The culvert beneath the WWTF and flood conveyance channel was constructed between 1964 and 1970. Much of the remaining channel is protected on the banks and bed with cobble riprap, of which the majority appears stable. Based on field observations completed at the time, an erosion rate of 0.05 m/yr is estimated. Regular monitoring, combined with localized bank restoration if necessary, was recommended as an appropriate method of managing future erosion risk along this channel (AECOM, 2008). Monitoring cross-sections were established and erosion pins were installed downstream of the rail line bridge/culvert by AECOM in 2008, to monitor possible effects of the removal of the culvert.

In 2009, the former rail line bridge/culvert located at the head of the flood conveyance channel was removed and a flood berm constructed. Based on erosion monitoring conducted between 2008 and 2010, no downstream geomorphic impacts have resulted from these works and the restored section is functioning as a riparian floodplain area. Erosion pin measurements found that the overall rate of change since establishment was a maximum of 0.03 m/yr (AECOM, 2010).

Rapid Geomorphological Assessment (RGA) and Rapid Stream Assessment Technique (RSAT) surveys were undertaken along the main channel of Serson Creek in 2011 as part of the LOISS (Aquafor Beech 2011a). A field survey was also undertaken in 2011 to support a scour assessment at Lakeshore Road. The findings of both surveys indicate that aggradation[3] is the dominant geomorphological process between Lakeshore Road and the culverted section under the WWTF, with low scour risk at the Lakeshore Road crossing. However, there is also

[3] Aggradation refers to increased creek bed elevation caused by deposition.

evidence that meanders are beginning to develop where the channel is actively adjusting and bank slumping is occurring. Although the channel currently remains in poor condition in terms of stream health, there is a good opportunity to rehabilitate the creek as part of the LWC Project.

Serson Creek has a low sediment supply from the surrounding land surface. The existing supply is sourced primarily from the channel bed and banks and a few tributary inputs. Sediment is comprised of mainly finer material (silts, sands and fine gravel), which are mobilized regularly. The existing channel configuration upstream of the WWTF and low gradient have created a depositional area upstream for over 200 m, noted by siltation on the bed.

Applewood Creek

Applewood Creek has a relatively larger drainage area than Serson Creek at 411 ha (CVC & TRCA 2012). The drainage area is less modified than Serson Creek, maintaining a natural open channel throughout the lower reaches. During field walks undertaken in 2011 the channel was observed to be wider at its downstream extent, with lower velocities and backwater conditions for a distance of 150 m upstream of Lake Ontario (Aquafor Beech 2011a).

A geomorphological assessment has already been undertaken for the downstream 472 m of Applewood Creek in the vicinity of the WWTF (Parish Geomorphic 2005). The creek flows within a well-defined valley with an irregular meander pattern because the meanders are partially confined by the shale valley wall adjacent to the WWTF. Average migration rates were calculated based on historical aerial photography as 0.12 m/yr with an average downstream migration of 0.16 m/yr (Parish Geomorphic, 2005). These are moderate rates and reflect meander development. RGA and RSAT surveys were also undertaken and indicate that the channel is adjusting through widening and aggradation. At the time of the survey, it was noted that debris (e.g. woody debris, municipal waste, etc.) were causing jams in the creek.

Similar to Serson Creek, field surveys were undertaken at Applewood Creek to inform a scour assessment at Lakeshore Road (Parish Geomorphic 2011). The watercourse upstream of Lakeshore Road is heavily modified with bed protection, aggraded material and some sections of exposed shale-bedrock. The banks are lined with armourstone (large limestone blocks) with gabion protection (stone filled wire baskets) towards the toe and top of bank. Downstream of Lakeshore Road, the channel banks consist of exposed bedrock due to deepening of the channel during the installation of the sanitary trunk sewer in the 1960s.

RGA and RSAT surveys were undertaken in the LWC Project Study Area as part of the LOISS study (Aquafor Beech, 2011a). The results indicate that, although the lower 150 m of Applewood Creek is backwatered, the channel is actively adjusting. Comparing the 2005 and 2011 survey results, it appears that the channel has continued to adjust by widening and planform

adjustment. Debris causing jams are noted in the LOISS study as an ongoing issue (Aquafor Beech, 2011b).

Similar findings were observed by Parish Geomorphic, and it was noted that aggradation, scour pools, and bar-formations occurred throughout this downstream reach. Such forms are indicative of sediment movement and storage within this backwater reach. Furthermore, debris jams will temporarily store sediment. These are temporary in nature as floods will mobilize fines stored around jams, and possibly remove/rework the structure itself.

The conditions and processes observed on each creek within the LWC Project Study Area will be used to develop 'Alternative Methods' and for the detailed assessment of the Preferred Alternative. Planform configurations and cross-section geometries for new reaches through the proposed LWC Project landform will be developed to reflect the current trends in each creek and, if possible, enhance stream function.

3.1.2 Bathymetry

Bathymetry refers to the underwater depth or topography of a lake, ocean or river. Baseline bathymetry is a critical component of the environmental assessment as it is considered in every aspect of coastal modeling, design, constructability assessment and cost estimates.

LWC Regional Study Area

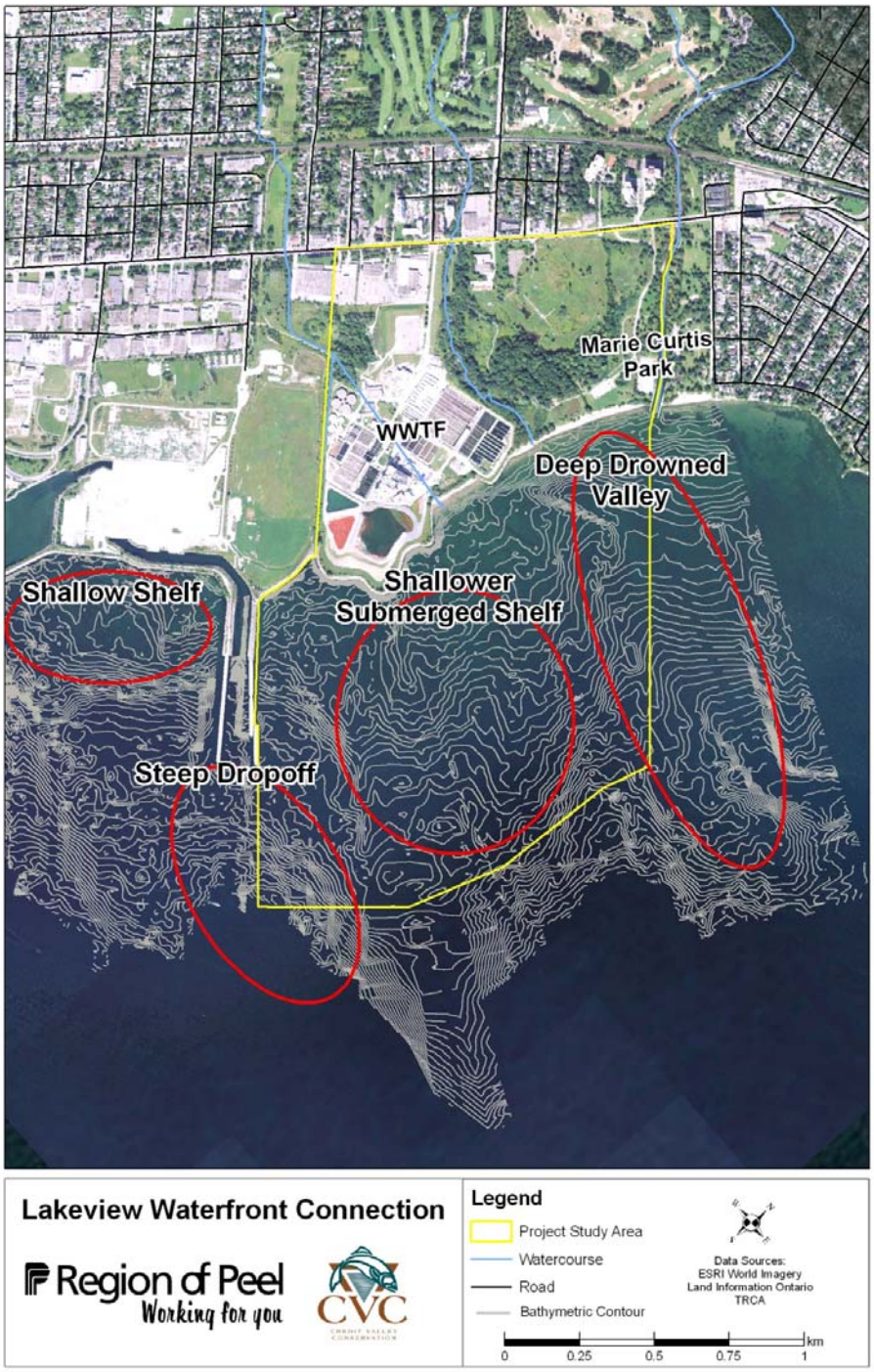
The LWC Regional Study Area extends offshore to approximately the 20 m depth contour (see Figure 3.3). Bathymetric data for the area is available in digital format from the Canadian Hydrographic Service. In addition, as part of LOISS, more detailed bathymetric data has been collected. The LWC Regional Study Area overlies the Etobicoke Shale Outcrop which consists of a thin till layer that originally covered the bedrock which has been scoured by glacial action leaving a prominent area of bedrock substrate that extends from the mouth of Mimico Creek westward to Burlington. This bedrock forms a convex shoreline profile consisting predominantly of broken shale boulders on top of bedrock extending into deep water (Aquatic Habitat Toronto 2013).

LWC Project Study Area

A detailed bathymetric survey of the LWC Project Study Area was completed in 2011 (Figure 3.3). Depths vary up to approximately 7 m along most of the outer edge; although, there is a steep drop-off approaching 10 m in the southwestern corner, fronting the edge of OPG's Lakeview site. There is a shelf-like feature fronting the WWTF resulting in nearshore bottom slopes that are flatter immediately in front of the WWTF than in front of Marie Curtis Park. Depths at the tip of OPG's Lakeview site breakwaters are in the order of 7 m. The existing

breakwaters at OPG's Lakeview site are expected to define the governing depth for nearshore processes due to their local influence on coastal processes (e.g., wave refraction, longshore sediment transport, etc.) and their proximity to the LWC Project Study Area.

Figure 3.3 Bathymetry within the LWC Project Study Area



3.1.3 Water Quality in Lakes and Creeks

In developing LWC 'Alternative Methods' and selecting a Preferred Alternative, it is important that water quality in the various creeks and Lake Ontario is not impaired at the intakes for the Regional water treatment facilities and along the nearshore areas. The following baseline water quality conditions will be used to assess potential changes in water quality that would result from the LWC Project.

LWC Regional Study Area

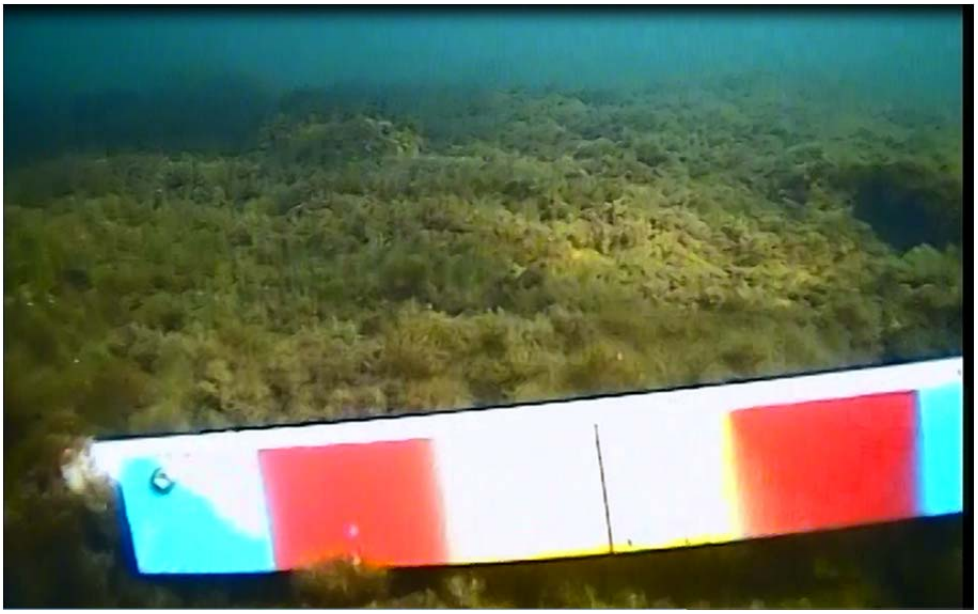
Generally speaking, storm sewer overflows and rivers are major sources of bacterial, nutrient, and total suspended solids (TSS) loadings along the LWC Regional and Project Study Areas. The Credit River is a significant source of nutrient loadings and is identified as 1 of 4 rivers that contribute more than 50,000 kg of phosphorous annually (LOISS 2011). The G.E. Booth WWTF and other WWTFs also contribute significant loadings of nutrients, particularly ammonia, as well as moderate loadings of TSS.

LWC Project Study Area

Sampling of Serson Creek identified exceedances for both Total Phosphorus and *E. Coli* when compared to Provincial Water Quality Objective (PWQO) targets. Chloride concentrations also exceeded Canadian Water Quality Guidelines (CWQG) targets. Although no target exists for Soluble Reactive Phosphorus, Serson Creek has been identified as problematic through field sampling at the mouth of the low flow channel. Despite these conditions there is no indication that these exceedances are limiting Serson Creek in supporting aquatic life. Sampling in Applewood Creek indicated parameters generally below PQWO targets for all parameters except *E. Coli*. Applewood Creek also exceeded CWQG targets for Chloride. These exceedances are not considered detrimental to aquatic life (CVC unpublished data, 2012). Benthic invertebrate sampling in 2011 indicated water quality was reflective of poor to fairly poor water quality with significant organic pollution in Applewood and Serson Creeks.

Large algal blooms are known to occur in the LWC Project Study Area due to high nutrient loads and the presence of mussels which increase the availability of soluble phosphorus and light penetration allowing algae to growth at increasing depths than previously. Underwater video collected within the LWC Project Study Area in 2012 depicted extensive areas of attached filamentous algae. During storms, filamentous algae can be detached and wash onshore where it decomposes adding to the unsightliness of the shoreline. Diver based benthic invertebrate sampling was conducted in 2012 in the vicinity of the WWTF to depths of 18 m (CVC unpublished data, 2012). The study indicated that benthic invertebrate densities were generally low and consisted generally of Quagga Mussels (*Dreissena bugensis)*, Tubificid worms, amphipods and Chironomids.

Figure 3.4 Screen Capture of Underwater Video of Filamentous Algae



Within the LWC Project Study Area, the beach at Marie Curtis Park is deemed unsafe for swimming more often than most of the beaches along Toronto's waterfront due to consistently high *E. Coli* levels given the beach's proximity to the mouth of Etobicoke Creek (Table 3.1). It is one of three beaches remaining in Toronto that have not reached Blue Flag status. The Etobicoke storm sewer overflows, and likely Cooksville Creek and the Humber River contribute to the high occurrence of beach postings at Marie Curtis Park. Table 3.1 provides a summary of beach closure postings at various Toronto beaches.

Table 3.1 Marie Curtis Park East Beach Closure Postings from 2007 to 2013 (Source: City of Toronto)

	Open	Closed	%open	%closed	total days
2007	63	29	68%	32%	92
2008	36	55	40%	60%	91
2009	17	42	29%	71%	59
2010	39	53	42%	58%	92
2011	71	21	77%	23%	92
2012	53	37	59%	41%	90
2013	55	36	60%	40%	91
Total	334	273	55%	45%	607

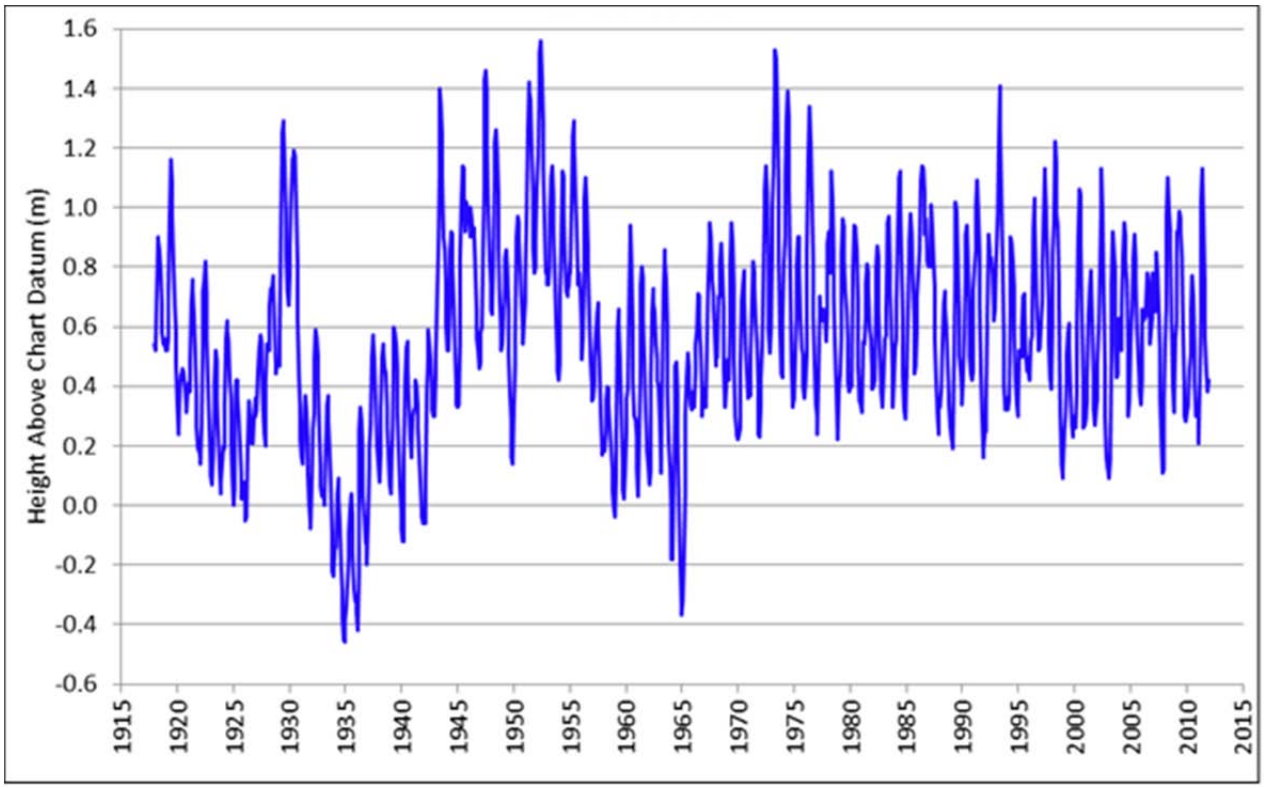
3.1.4 Lake Water Levels

Lake water level fluctuations alter the position of the shoreline and impact coastal wetland ecology, river channel hydraulics due to lake-backwater effects, the functioning of constructed infrastructure (such as culverts and water control gates), and all physical coastal processes. An understanding of water level fluctuations is important to the development of 'Alternative Methods' and the detailed assessment of the LWC Preferred Alternative.

LWC Regional and Project Study Areas

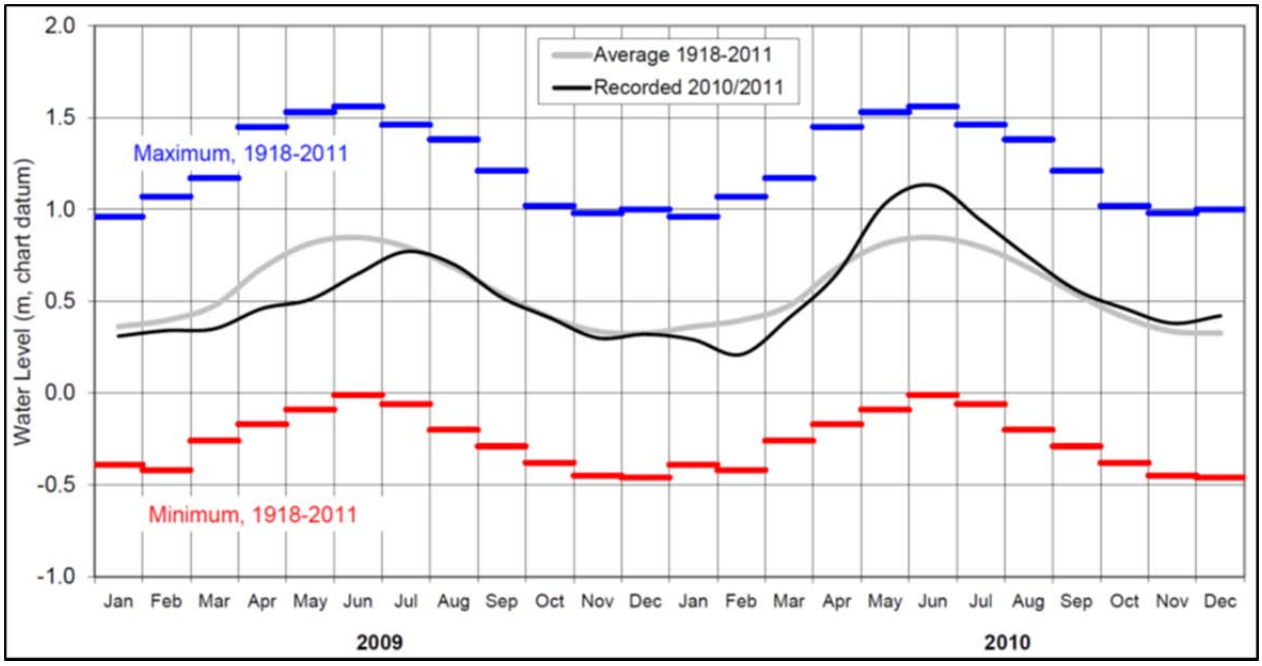
Water levels on Lake Ontario fluctuate in the short-term, seasonal and long-term (see Figures 3.5 and 3.6).

Figure 3.5 Lake Ontario Monthly Mean Water Levels (1918-2011)



Short-term fluctuations last from less than an hour up to several days and are caused by local and regional meteorological conditions. These fluctuations are most noticeable during storm events when barometric pressure differences and surface wind stresses cause temporary imbalances in water levels at different locations on the lake. These storm surges, or wind-setup, are most noticeable at the ends of Lake Ontario, particularly when the wind blows down the length of the Lake. Due to the depth of Lake Ontario, storm surge is not as severe as occurs elsewhere on the Great Lakes (such as in Lake Erie).

Figure 3.6 Lake Ontario Hydrograph, Mean Monthly Lake Levels



Seasonal fluctuations reflect the annual hydrologic cycle which is characterized by higher net basin supplies during the spring and early part of summer with lower supplies during the remainder of the year. Seasonal water levels generally peak in the summer (June; above 75.5 m) with the lowest water levels generally occurring in the winter (December; below 74 m). The average annual water level fluctuation is approximately 0.5 m, and tends to remain between 74 and 75.5 m. Although water levels below 74.2 m, which is chart datum[4] for Lake Ontario are rare, the lowest monthly mean on record is approximately 73.8 m below chart datum. Lake water level gauge data at (02HC048) Toronto indicates that the highest water level exceeded 75.8 m in 100 years of record.

Long-term water level fluctuations on the Great Lakes are the result of persistently high or low net basin supplies. More than a century of water level records show that there is variability in the average at seasonal, inter-annual and decadal scales, making it difficult to predict long-term water level fluctuations. Some climate change studies that examined the impact of global warming have suggested that long-term average water levels on the Great Lakes will be lower than they are today. Those studies have also shown that temporal lake level variability is anticipated to increase. Those changes, however, are expected to have a lesser impact on

[4] Chart datum is a vertical reference system that has been standardized to a reference point to which depths on nautical charts, tidal height predictions and water level measurements are referenced. The referenced chart datum on the Great Lakes is the International Great Lakes Datum (1985). It is generally set at a level below which the water level rarely falls.

average Lake Ontario water levels than on the upstream lakes because Lake Ontario water levels are regulated. Within the regulation scheme however, water levels can fluctuate by over 1 m. The International Joint Commission has been considering possible changes to the regulation of Lake Ontario but no final decision has been made at the time of writing this report. Currently, most approving agencies, including CVC and TRCA, require that the 100-year instantaneous water level, typically those determined by MNR, be used for the design and assessment of shoreline protection structures. Within the LWC Project Study Area, the instantaneous water level elevation is 75.8 m.

3.1.4.1 Wave Conditions

An assessment of wave conditions is required to understand littoral sediment transport (see Section 3.1.6), coastal erosion and deposition processes, and water movement. Wave information is also required for the design of shore protection structures related to sizing of materials, shoreline orientation and maximum elevations required.

LWC Regional and Project Study Areas

Measured wave data on Lake Ontario, as on most bodies of water, is very limited and generally covers only short periods of time. For this reason a procedure called hindcasting is used to produce long term wave climates based on measured wind data. Long term records of wind data are readily available for most locations. The hindcasting procedure uses well established formulations to create wave climate sets. The hindcasting models have been calibrated for use on Lake Ontario on previous projects.

A 36-year wave hindcast was carried out using Toronto Island wind data to produce deep water wave conditions offshore of the site. Wind data recorded from January 1, 1973 to December 31, 2008 was used to produce hourly estimates of the deep-water significant wave height, peak wave period and mean wave direction. Wind data prior to 1973 was not used due to the relatively high occurrence of missing data.

The deep-water wave climate offshore of the LWC Project Study Area has a bi-nodal distribution of the total wave power with predominant easterly and southwesterly peaks. Figure 3.7 shows the directional distribution of the highest hindcast wave heights and the total offshore wave power. Approximately, 72% of the total power comes from the east, approximately 22% comes from the southwest and the remaining 6% is distributed over all other directions. Figure 3.8 presents “all-directions” wave height and period exceedance curves which show the percentage of time a given wave height or period is exceeded. Figures 3.9 and 3.10, respectively, show the annual and monthly variation of the total offshore wave power from the 36-year hindcast.

Figure 3.7 Distribution of Highest Hindcast Wave Heights and Total Wave Power

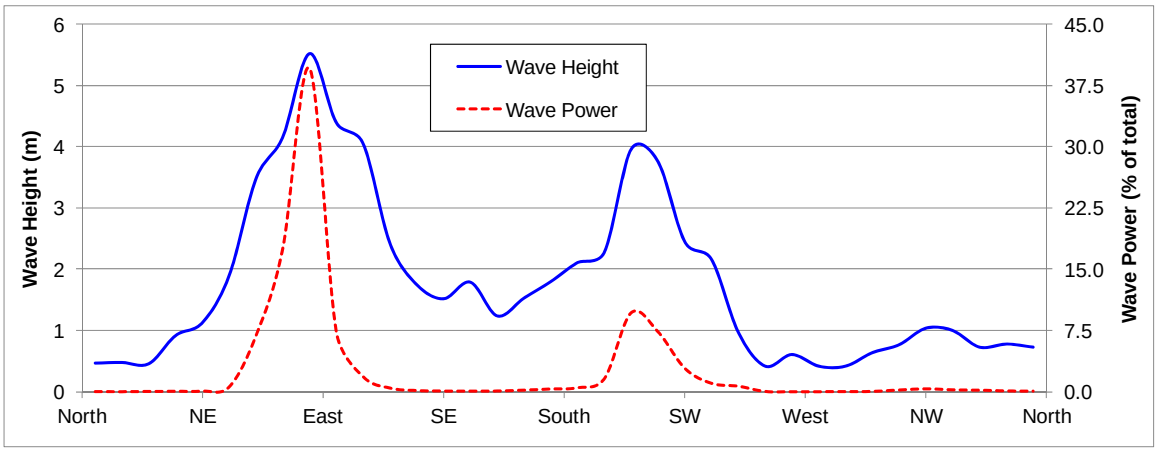


Figure 3.8 Wave Height and Period Exceedance Curves

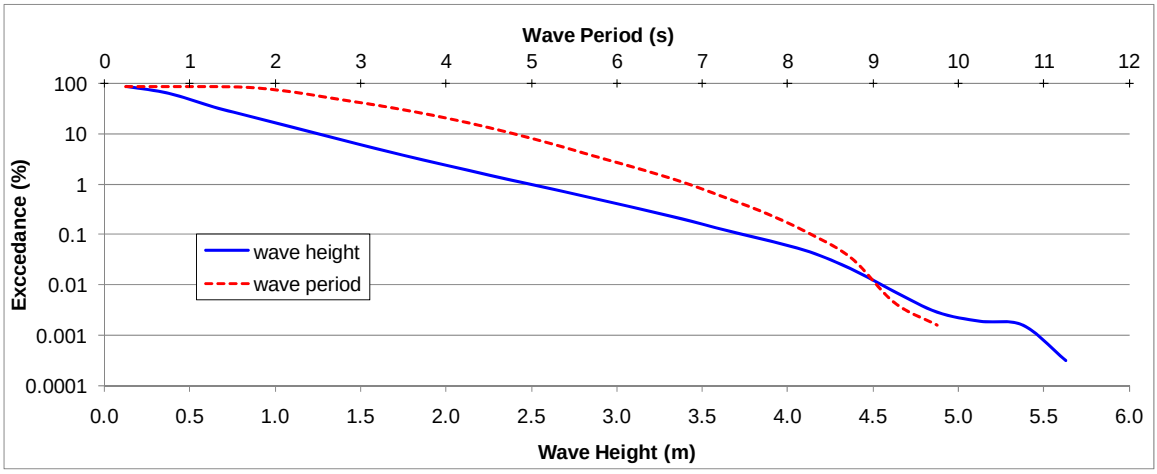


Figure 3.9 Monthly Distribution of Total Wave Power

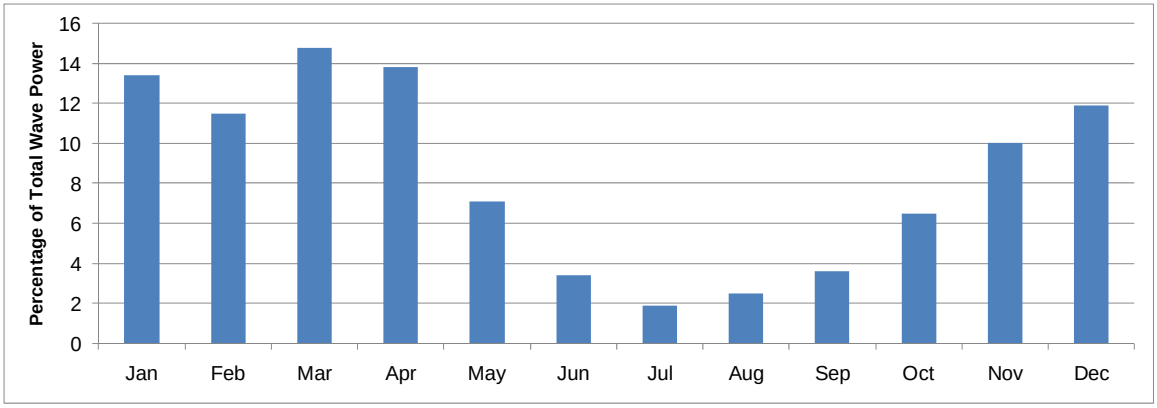


Figure 3.10 Annual Distribution of Total Wave Power

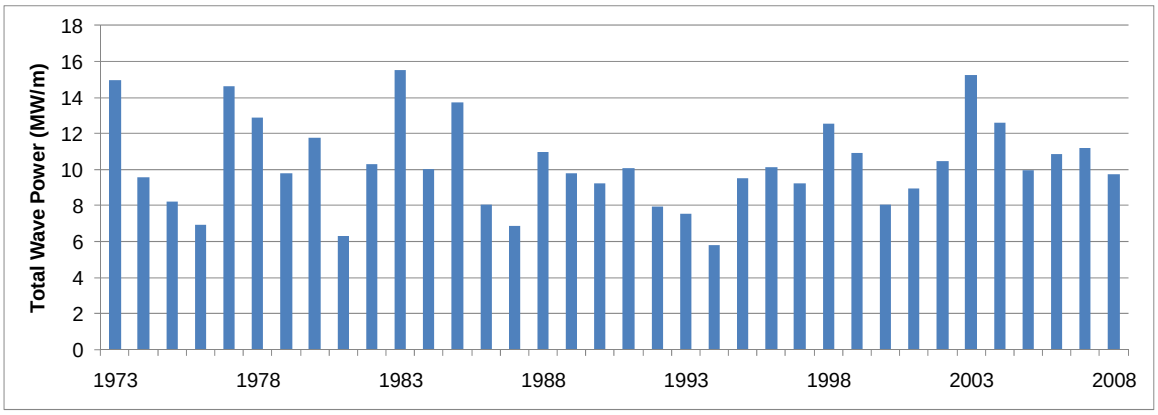


Figure 3.11 shows the results of an extreme value analysis of easterly storm events wave heights. The design 100-year return period wave condition has a wave height of 5.8 metres with a period of 10.5 seconds. A similar analysis of southwesterly storms yields a 100-year return period wave with a 4.5 m wave height and an 8 second wave period for waves coming from that sector.

Nearshore design wave heights and wave climates were determined by transferring the offshore wave conditions in to the site using a two-dimensional spectral wave model with energy dissipation and diffraction terms. The model simulates a steady-state spectral transformation of directional random waves co-existing with ambient currents in the coastal zone. It includes features such as wave generation, wave reflection, wave diffraction, and bottom frictional dissipation. Nearshore bathymetry in the wave model was synthesized from surveys conducted by the Canadian Hydrographic Service and the detailed bathymetric survey of the LWC Project Study Area described in Section 3.1.2.

Nearshore wave climates were produced by transferring a large number of representative offshore wave conditions and using the results of the transformations to interpolate nearshore waves for each wave in the 36-year hindcast. This produces nearshore waves at any location within the model grid.

Design wave conditions throughout the LWC Project Study Area were determined by transferring specific offshore wave conditions with the CMS-Wave numerical model. Figure 3.12 shows the 100-year offshore wave condition transferred inshore at the 100-year instantaneous water level. This represents the upper limit of design conditions usually considered in coastal applications. Extreme values of both offshore wave conditions and water levels are typically considered because both play a major role in determining the nearshore wave condition.

Figure 3.11 Peak-Over-Threshold Extreme Value Analysis (Easterly Storms)

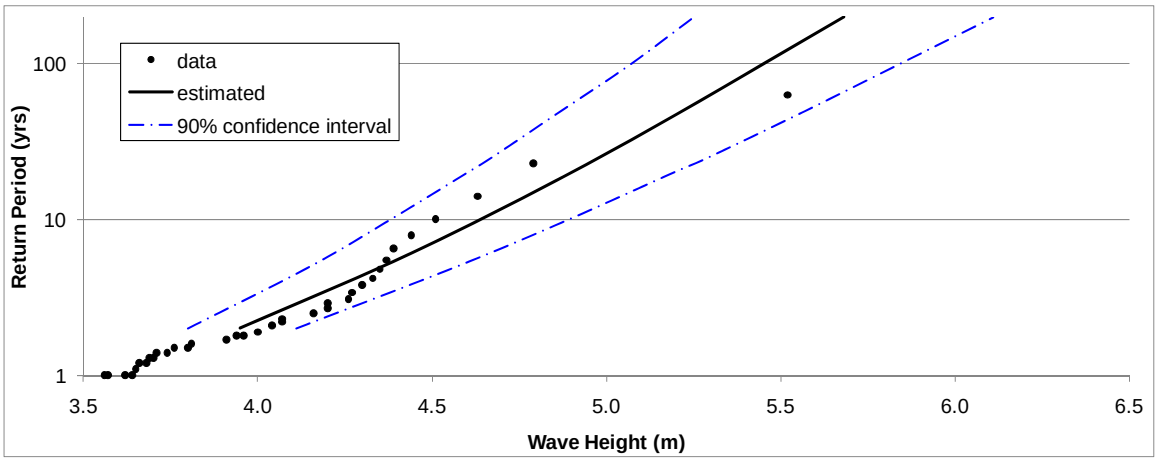
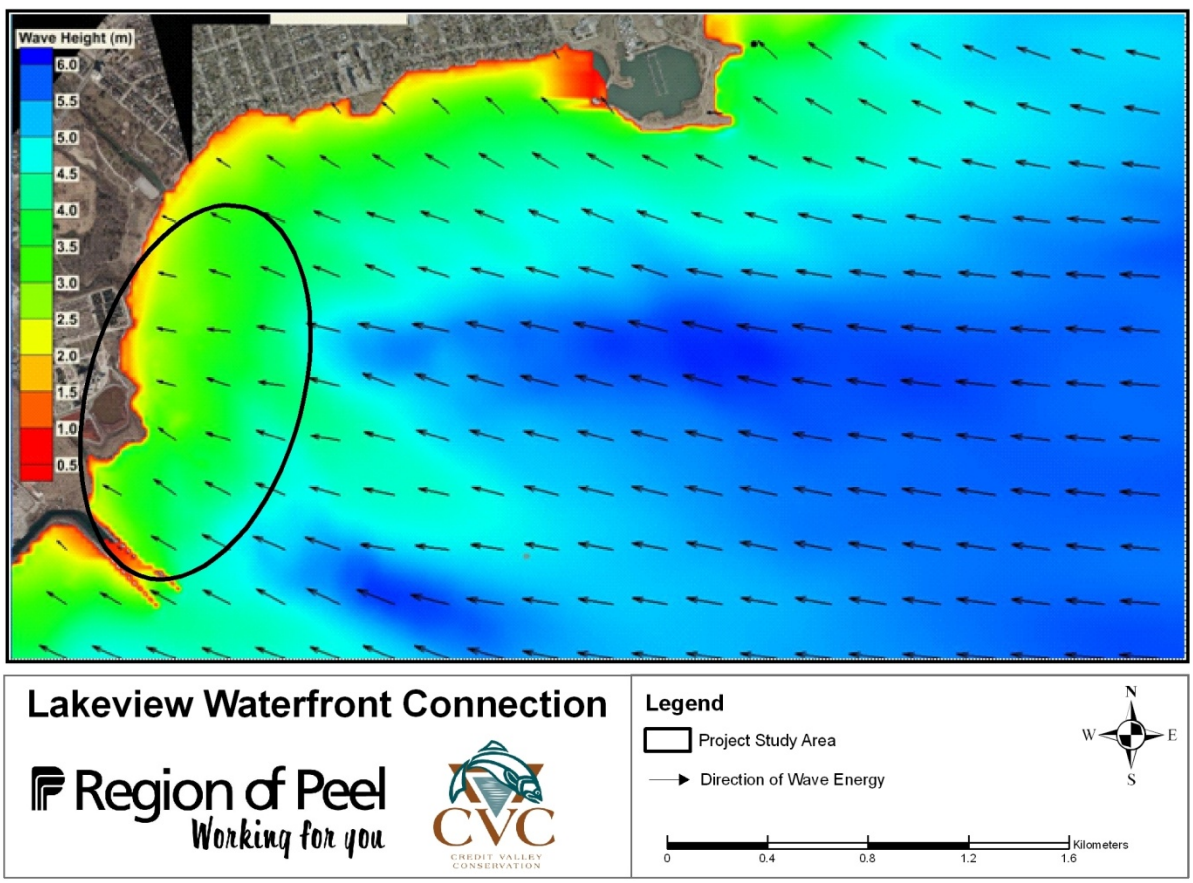


Figure 3.12 Design Wave (100-yr wave, 100-yr water level)



3.1.4.2 Flooding

In developing 'Alternative Methods' for the LWC Project, it is important to understand how different LWC Project activities could affect flooding. The following provides a baseline from which LWC 'Alternative Methods' and the Preferred Alternative can be evaluated.

LWC Regional Study Area

The LWC Project activities will not affect the flood plain of any watercourses within the LWC Regional Study Area; as such, no description of flooding within the LWC Regional Study Area is required.

LWC Project Study Area

Applewood and Serson Creeks are the only watercourses located within the LWC Project Study Area (Etobicoke Creek bounds the eastern side of the Project Study Area only).

Table 3.2 outlines the design flows for Applewood and Serson Creeks.

Table 3.2 Design Flows at Lake Ontario

Water Course	Regional	Return Period					
		100-yr (m^3/s)	50-yr (m^3/s)	25-yr (m^3/s)	10-yr (m^3/s)	5-yr (m^3/s)	2-yr (m^3/s)
Applewood	50.2	31.3	26.8	22.7	18.5	13.8	9.6
Serson	23.4	18.2	14.9	12.4	9.8	6.7	4.1

Analysis undertaken for Applewood Creek as part of floodplain mapping indicated that no structures are at risk south of Lakeshore Road. During one of the August 2009 storms, the Dixie underpass was partially filled with water from Applewood Creek and St. Mary's Avenue was inundated with floodwaters.

The flood prone area from Serson Creek in the WWTF has been eliminated with grading works done in recent years. The Lakeshore Road crossing of Serson Creek is undersized and results in upstream ponding under the Regulatory Flood.

The City of Mississauga is currently undertaking works to replace the Applewood and Serson Creek culverts at Lakeshore Road. Works are anticipated to be undertaken in 2014 and will enlarge the crossings to allow unrestricted conveyance of the Regional Storm. Re-establishing fish access upstream of the Lakeshore Road crossings is also being incorporated as part of the culvert upgrades.

3.1.5 Littoral Sediment Transport

Littoral sediment transport refers to the movement of sediments (e.g. sand, silt, clay) along a coastline resulting from the continual erosion and deposition of sediments resulting from swash and backwash in the littoral zone. This process will inform the generation of shoreline treatments for the development of 'Alternative Methods' and the detailed assessment of the Preferred Alternative.

LWC Regional and Project Study Area

The shoreline from Burlington to Toronto is generally referred to as a non-drift zone due to the lack of littoral (coastal) sediments. On many shores of the Great Lakes, littoral sediment supply originates from erosion of shoreline bluffs and the nearshore lakebed. Within both the LWC Project Study Area and the LWC Regional Study Area, the majority of the shoreline has been hardened, essentially eliminating bluff erosion, and the nearshore lakebed is erosion-resistant bedrock. Some sediment transport does take place because of nearshore bottom deposits, but there is no significant source of new littoral material. Sediment introduced via the watercourses (creeks, rivers, etc.) that discharge into Lake Ontario is typically fine grained and tends to deposit in deeper water offshore of the littoral zone. Therefore, the beach at Marie Curtis Park does not receive any substantive natural sources of sand or gravel; rather, the City of Toronto has had to nourish the Marie Curtis Park beach on both sides of Etobicoke Creek to ensure safety and to continue to provide access for permitted uses such as volleyball. This is completed on an as needed basis only and is not a part of routine maintenance operations.

A one-dimensional sediment transport model was used to evaluate the potential sediment transport rates for uniform shorelines within the LWC Regional Study Area. Potential transport is the transport that would be expected to occur if the transport rates were not limited by sediment supply. The model assumes that sediment is transported by uniform alongshore currents generated by breaking waves. However, the currents will not be uniform in the vicinity of structures extending offshore, so some interpretation of the predicted transport rates is required.

Figure 3.13 shows the cross-shore distribution of the predicted potential alongshore sediment transport rates for a sample profile extending out from Marie Curtis Park. By definition, sediment transport rates are positive for sediment moving from left to right past the beach (when facing offshore) and negative when moving from right to left. At this site, sediment moving from northeast to southwest is therefore defined as positive transport and sediment moving from southwest to northeast is defined as negative transport. The gross transport rate is the sum of the positive and negative transport rates and the net transport rate is the difference between the positive and negative transport rates. As the net transport for this profile is positive, it is from

northeast to southwest, or moving from Marie Curtis Park towards Port Credit.

Figure 3.13 Average Annual Potential Sediment Transport Rates, LWC Regional Study Area

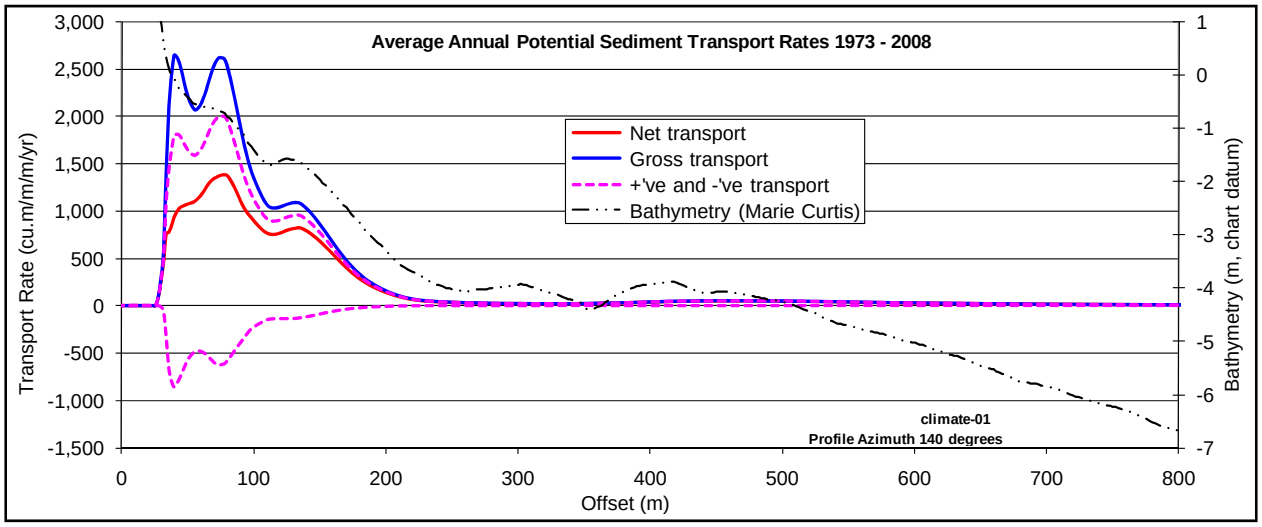


Figure 3.14 shows the gross and net transport rates from Figure 3.13, summed across the profile. Figure 3.15 shows the gross transport rate from Figure 3.14 expressed as a percentage of the total predicted gross potential transport rate.

Together, Figures 3.13 to 3.15 show where transport tends to take place across the nearshore profile. Less than 10% of the predicted potential sediment transport takes place in depths greater than 4 metres below datum, and only 1 to 2 % of the transport takes place in depths greater than 7 metres below datum.

Figure 3.14 Cumulative Sediment Transport Rates, LWC Regional Study Area

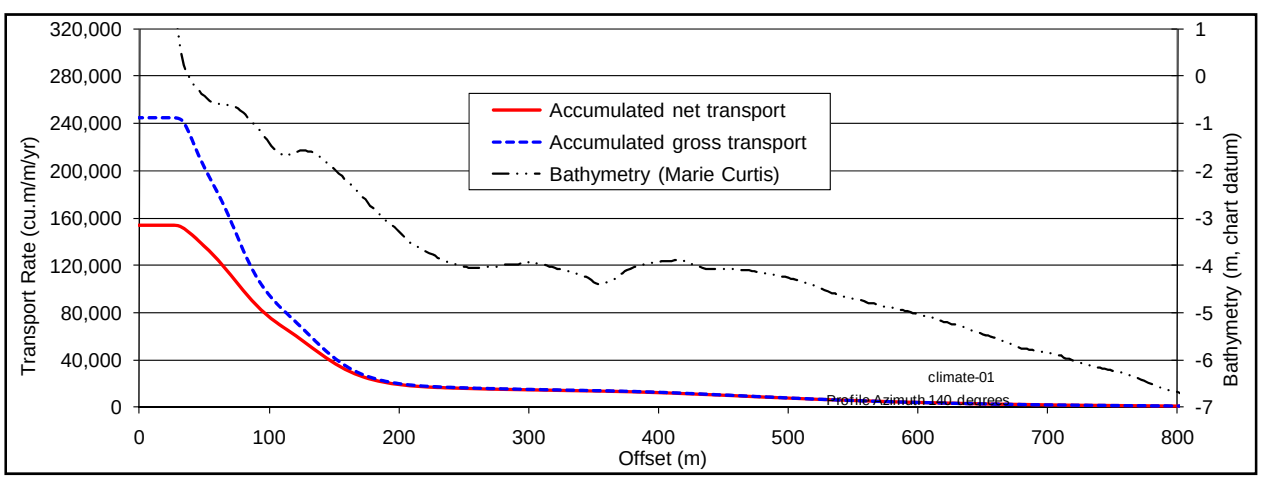
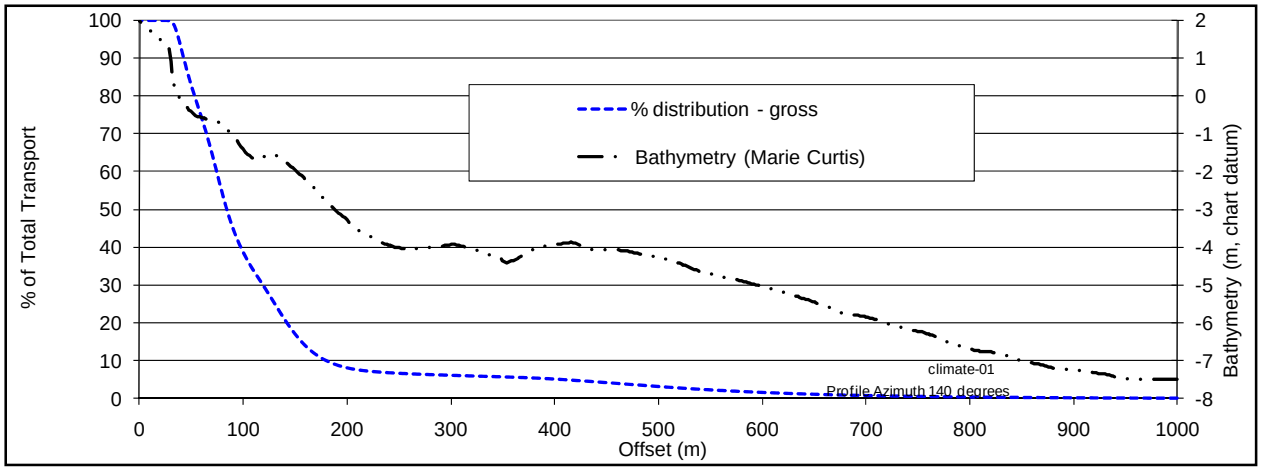


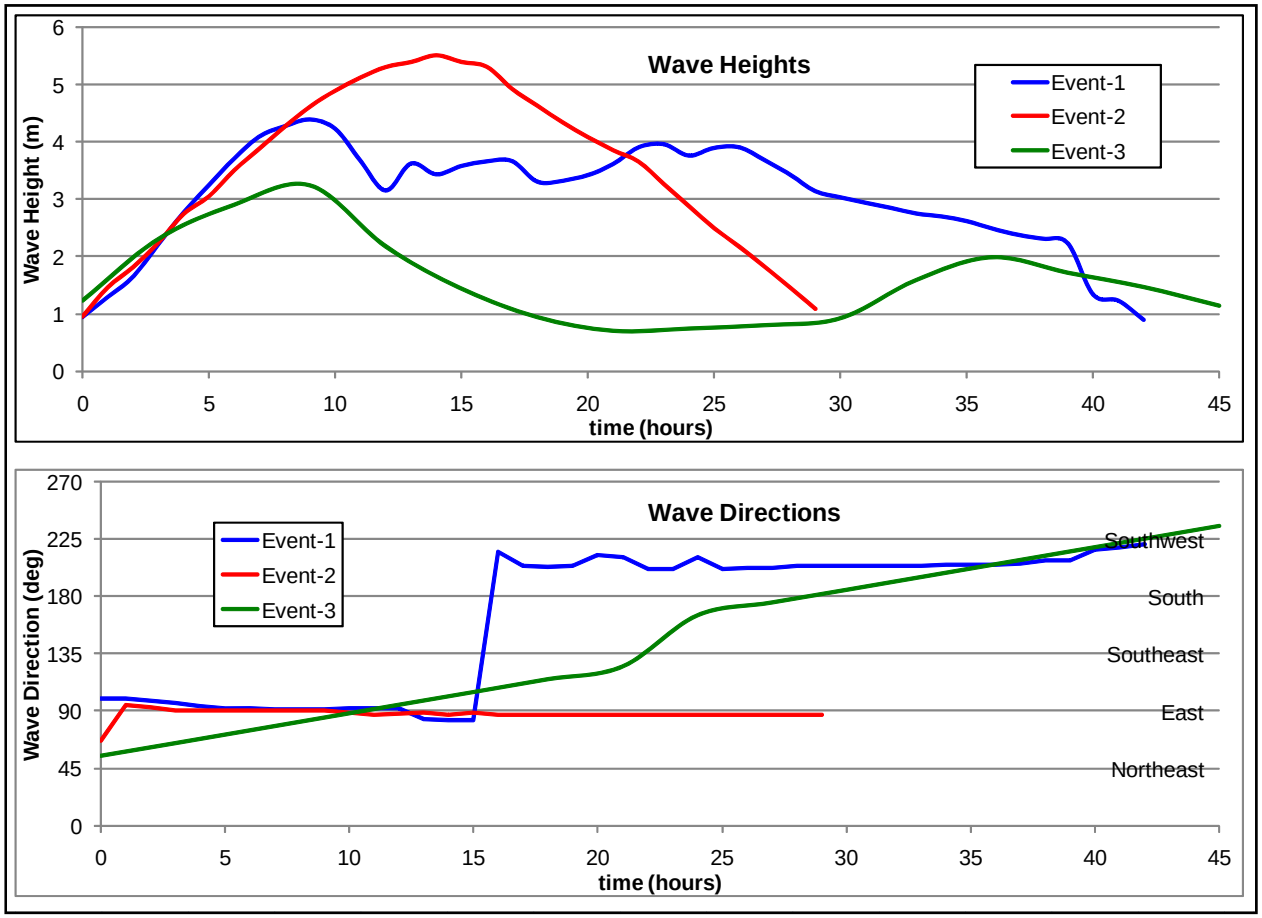
Figure 3.15 Percentage Distribution of Regional Potential Gross Sediment Transport Rate



Sediment transport conditions within the LWC Project Study Area were also investigated using a two-dimensional sediment transport model capable of considering the effects of local structures on the nearshore flow field. Baseline conditions for the analysis of the potential effects of the preferred alternative were established by modeling three representative storm conditions with separate runs of the 2D model. Event-1 was a typical major storm event passing the site. Waves originally come from the east then swing through the southwest as the storm front passes. Event-2 was the largest storm from the 36-year hindcast and consisted of easterly waves only. Event-3 was a "constructed" storm event consisting of the average of the highest annual wave height per direction sector from the 36-year hindcast, for 10-degree wide sectors. Events 1 and 2 represent major storm events and event 3 is representative of average annual storm conditions. Figure 3.16 shows time series plots of the wave heights and directions for the modeled events.

Results from the sediment transport modeling under existing conditions will be used as baseline conditions for the assessment of the potential impacts of the preferred alternative.

Figure 3.16 Storm Events for Sediment Transport Modeling



3.1.6 Ice and Debris

Ice formation and debris inputs can affect the created landform and its various ecological elements such as wetlands, streams and beaches. The following baseline information will inform the development of 'Alternative Methods' and the detailed assessment of the Preferred Alternative.

LWC Regional and Project Study Area

Under typical conditions Lake Ontario is considered to remain ice free, allowing wave generation throughout the year. Shore ice, which is ice that forms around the perimeter of the lake, can both protect and damage shorelines; however, development of shore ice is annually variable depending upon local climate conditions and storm event details.

Debris from watercourses and storm sewer systems is typically made up of urban refuse such as plastic bags, water bottles, yard waste, and take-out containers, as well as woody debris such as

sticks and logs. Woody debris is generally considered beneficial. Within the LWC Project Study Area, large volumes of urban debris are regularly observed along the beach at Marie Curtis Park and on the beach between the two WWTF headlands. This material comes from the Lake Ontario shoreline and Etobicoke, Serson and Applewood Creeks. Debris is widely scattered across beach shorelines during storm events and tends to collect against structures that extend out into the lake.

The City of Toronto Parks staff have confirmed that as a part of their regular maintenance operations the beaches at Marie Curtis Park east and west are mechanically raked up to the municipal boundary.

3.2 NATURAL ENVIRONMENT

The shoreline represents the interface between the aquatic and terrestrial ecosystems, with plants, animals, nutrients, resources and energy being cycled between the two environments. The interface is generally referred to as the 'riparian' zone with the character of the shoreline riparian zone being closely linked to its geomorphology, lakebed materials, and coastal processes. Lake Ontario has a moderating effect on local temperature and climate, and combined with the physiography of the Project Study Area, creates unique conditions for natural habitats that are reflective of the broader Deciduous Forest Region or Carolinian Life Zone.

An understanding of aquatic and terrestrial habitats will inform the development of 'Alternative Methods' and the detailed assessment of the Preferred Alternative.

3.2.1 Aquatic Habitat

Aquatic habitat refers to the natural and built features that are utilized by aquatic organisms to fulfill portions of their life cycle or other behaviours critical to their survival. A survey of existing habitat is a critical component of the EA as it is considered in the development of conceptual designs, evaluation criteria and the preferred alternative.

LWC Regional and Project Study Areas

Aquatic habitats within Ontario's Great Lakes including both the LWC Regional and Project Study Areas have undergone substantial change from their historical conditions:

- Up to 75% of historic wetlands within heavily settled Great Lakes environments have been lost to activities such as land use change, filling, dredging, and disturbance (Whillans 1982).
- The Lake Ontario shoreline within CVC's jurisdiction is almost completely hardened, with only 20% of the shoreline retaining some natural structure and function.

- Historical stonehooking activities along the Mississauga shoreline resulted in changes in, and destruction of, nearshore aquatic habitat through the removal of structure and shelter for fish, including the now extinct Lake Ontario population of Atlantic Salmon (Martin 2007). The loss of virtually all cobble substrates and the elimination of Lake Trout spawning reefs are also attributed to stonehooking (Whillans 1979), with estimates of as much as 4 million tonnes having been removed from the nearshore Regional Study Area (CVC unpublished).
- Past land creation and shoreline modifications associated with OPG's Lakeview site and the WWTF were undertaken to allow for the expansion and protection of industrial activities, and did not consider fish or wildlife habitat.

3.2.1.1 Lake Ontario

LWC Regional Study Area

The shoreline in the LWC Regional Study Area consists primarily of erosion protection structures, such as armourstone, revetments, concrete, rubble and rip rap, with approximately 80% of the shoreline west of the LWC Project Study Area hardened. Hardening the shoreline impedes the movement of species between upland and lake habitats; restricts the ability of vegetation to take hold; and in many cases eliminates the potential habitat and feeding areas for waterfowl, shorebirds, and aquatic organisms. The armoured shorelines within the LWC Regional Study Area were designed specifically to protect infrastructure, and provides limited aquatic habitat.

Within the entire LWC Regional Study Area, fifty-two species of fish have been observed. Appendix B, Table B-1 provides a list of all fish species recorded within the LWC Regional and Project Study Areas. Forty-three species of fish have been recorded to the west of the LWC Project Study Area since 2008, including Smallmouth Bass, Northern Pike, Pumpkinseed, Yellow Perch Emerald Shiner, Brown Trout and Brown Bullhead. Records also include the following species of note: American Eel (Endangered provincially and Special Concern federally); Atlantic Salmon; Walleye; Longnose Gar; Bowfin; and White Bass. While the diversity of species is relatively high, the abundance of fish captured in this area is low and is typical of a degraded environment (i.e., low availability of fish habitat).

To the east of the LWC Project Study Area (primarily around and within Colonel Sam Smith Park), 37 species of fish have been recorded along the open coast and embayment area, since 1989. White Sucker was the most numerous and consistently caught fish throughout the period of record, while Common Carp was also ubiquitous throughout the samples. American Eel and Brown Trout were frequently caught throughout the 1990s, but reduced to sporadic captures in the 2000s. American Eel are typically found within the embayment of Colonel Sam Smith Park,

but were last captured on the open coast side of Colonel Sam Smith Park in 1998. Conversely, the incidence of capture for Alewife, Emerald Shiner, Lake Chub, Northern Pike, Pumpkinseed, Rock Bass, Smallmouth Bass, Walleye, and Yellow Perch has increased over the last ten years.

American Eel is the only aquatic species with conservation status within the LWC Regional Study Area, but has not been captured in the LWC Project Study Area. There are eleven introduced and/or invasive species found within the LWC Regional Study Area, including Round Goby and Common Carp. In addition, Zebra Mussel (*Dreissena polymorpha*) and Quagga Mussel (*D. rostriformis bugensis*) populations have been found all along the Mississauga shoreline (Pollutech 2012) and likely exist along the length of much of the Lake Ontario shoreline.

LWC Project Study Area

Open coast habitat dominates the LWC Project Study Area. Substrates in this habitat are generally sands, rip-rap, or cobbles over shale. The associated shoreline types within the LWC Project Study Area range from a sand beach at Marie Curtis Park West; a remnant beach located south of the WWTF (which is bounded by two armoustone headlands); armourstone and revetment south of the WWTF; and concrete reinforced barges, used to create the eastern pier off OPG's Lakeview site. As the majority of the shoreline has been protected, the elimination of bluff erosion has resulted in sediment starved littoral conditions.

Nearshore forage habitat is important for spawning and feeding. However, the extensive shoreline hardening, and erosion-resistant bedrock within the nearshore lakebed (largely a result of historic stonehooking activities), provides for limited habitat diversity in the nearshore area. In addition, there is no submergent vegetation within the entire LWC Project Study Area.

Thirty six species of fish have been found in the LWC Project Study Area. Of these, 17 were found in the area most likely to be affected by the LWC Project. The fish community likely to be affected by the LWC Project consists of fish species typically found in this type of habitat, including common fish such as White Sucker, Common Carp, Alewife, Lake Chub, Longnose Dace, Emerald Shiner and the invasive Round Goby.

3.2.1.2 Creeks

The life cycle of several species living in Lake Ontario, especially fish, have critical stages of their life located upstream within adjoining watersheds or at the mouth of creeks feeding Lake Ontario. Creek mouths are typically associated with coastal wetlands. These areas provide the necessary habitat conditions for many fish species and life stages including reproduction, juvenile rearing, and end of life. Given the historic loss of the entire coastal wetlands that once

connected the mouths of Etobicoke, Serson and Applewood Creeks, and the complete isolation of the Serson Creek watershed from Lake Ontario, the LWC Project offers the opportunity to re-establish missing habitat that is critical for many life cycle stages for fish and other species.

LWC Regional Study Area

In total, 18 creeks discharge directly to Lake Ontario within the LWC Regional Study Area (Figure 3.1). Of these creeks, three (Lakeside, Moore, and Cumberland Creeks) either contain no fish (due to blockages near the shoreline or complete enclosure) or there is no data for these watercourses. Fish records in Avonhead, Clearview, Turtle, Birchwood, Tecumseh and Lornewood Creeks indicate tolerant warmwater communities typical of urban streams.

In total, thirty-two species of fish have been found in the streams and estuaries of creeks and rivers within the LWC Regional Study Area. Appendix B, Table B-1 provides a list of all fish species recorded within the LWC Regional and Project Study Areas including those found in the streams and creeks.

LWC Project Study Area

Within the LWC Project Study Area, three creeks discharge directly to Lake Ontario (from east to west): Etobicoke Creek (marking the eastern boundary of the LWC Project Study Area); Applewood Creek; and Serson Creek. Historically, these creeks played a significant role as spawning and nursery areas for numerous lake resident fish including a large coastal wetland that connected all three creeks at their mouths. Today, these are highly urbanized systems with poor quality fish habitat. Due to the enclosure of the low flow channel and blockage of the high flow channel, fish are currently unable to access Serson Creek from Lake Ontario.

Fish records for two Etobicoke Creek monitoring stations indicate that 31 species were recorded at the mouth of the creek and 16 species found upstream to Lakeshore Road. Seven of the upstream species were not previously identified at the mouth for a total of 35 unique species. The most consistent and numerous fish caught at the mouth of Etobicoke Creek are White Sucker and Common Carp. However, since 2003, Emerald Shiner and Alewife have been routinely captured in large numbers. Many of the species found in Lake Ontario are found in the lower reaches of Etobicoke Creek supporting the need for tributary access from the lake. This fish community depicts a fish population dominated by resilient, cool, and warmwater species.

While Applewood Creek is enclosed upstream of South Service Road, the confluence with Lake Ontario remains natural and fish are regularly able to access Applewood Creek. A total of six species have been recorded up to Lakeshore Road, including migratory White Sucker. No fish were caught upstream of Lakeshore Road. Lakeshore Road is currently identified as a barrier to fish migration, although the City of Mississauga is currently upgrading the culverts at Lakeshore

for both Serson and Applewood Creeks. CVC will continue to advise the City of Mississauga to provide conveyance up to the Regulatory Flood and enhanced fisheries access upstream as part of the culvert replacement works. The mouth of Applewood Creek provides habitat for a number of species such as Fathead Minnow and Lake Chub.

Serson Creek has undergone numerous diversions and currently splits upstream of the WWTF, with baseflows piped under the WWTF to Lake Ontario and high flows diverted through a straight, open channel, along the eastern boundary of the OPG Lakeview site (see also Section 3.1.1.2). No fish have been captured in sampling events in 2011 in Serson Creek above the diversion channel. The underground diversion prevents fish from entering the creek from the lake, while the higher flow channel is frequently dry and blocked with debris at the mouth; as such, sampling has not found any fish present in Serson Creek.

3.2.2 Terrestrial Habitat

Terrestrial habitat found within a few kilometres of the Lake Ontario shoreline serves an important role in supporting both resident and migratory species. With the limited natural cover that exists along the Lake Ontario shoreline, even small habitat patches in urban and urbanizing areas are of value and associated losses and/or gains have a much greater relative impact to overall ecosystem functions (CVC 2012; NSEL 2009; TRCA 2007).

LWC Regional Study Area

The natural cover within the LWC Regional Study Area is composed of forested and successional areas. Small wetland communities exist but are restricted to riparian areas along streams, the Credit River, and coastal embayments.

The majority of natural forest cover within the LWC Regional Study Area occurs in concentrated pockets isolated from one another by a matrix of urban land uses. These small forests occur along the shoreline, inland, and along the Credit River valley. The matrix of residential, commercial/industrial and institutional land that fills the spaces between natural areas is not devoid of vegetation, nor is it completely lacking in ecological activity. Because of the history of development in areas such as Port Credit, Mineola and Clarkson, many communities in the LWC Regional Study Area contain an urban forest composed of mature tree canopy and understories of both native and non-native vegetation.

The forests in the LWC Regional Study Area are similar to those in other heavily urbanized areas in that they contain a significant component of non-native vegetation. Human disturbances related to encroachments and off trail uses and intensive management are evident in many forests where reduced regeneration and forest understory structure are evident.

Successional communities in the LWC Regional Study Area include cultural meadows, cultural savannahs, cultural thickets, cultural woodlands and cultural hedgerows that are relatively spread out. They occur on both public and private lands and generally have been created or maintained as the result of human influences or other factors. Often the composition and function of the community is altered compared to communities that are less heavily human influenced. Within the LWC Regional Study Area successional communities make up a considerable portion of the non-urban land in the nearby OPG Lakeview site and are also clearly evident near Port Credit (the Imperial Oil lands) as well as in Marie Curtis Park and the associated Arsenal Lands.

Wetland communities within the LWC Regional Study Area make up less than 1% of the land cover, and only exist in isolated pockets. The largest wetlands occur at Rattray Marsh and the Credit River Marshes to the west of the LWC Project Study Area, and smaller wetland communities dot many of the urban creeks and creek mouths. The scarcity of wetland habitat in the LWC Regional Study Area echoes the state of wetlands across southern Ontario and the Greater Toronto Area where settlement, land conversion, and intensification have historically resulted in the especially high loss of wetland vegetation. Approximately, 50% of the wetlands along Ontario's Great Lakes have been lost; and up to 90% have been lost along the most urbanized shorelines (Governments of Canada and The United States of America, 2005). Land use change, filling, dredging, and disturbance are the most notable causes of the reduction.

Dynamic communities including beaches (including treed beach ridge) are restricted to shoreline areas. Within the LWC Regional Study Area only approximately 16% of the Mississauga shoreline is made up of natural beaches, bars, or short bluffs; other man-made beaches occur to the east at Colonel Sam Smith Park. Although beaches are difficult to classify with the mapping protocol for Ecological Land Classification due to their narrow linear shape and small size, based on our current mapping, there are less than 10-ha of beach habitat (open or treed, natural or created) within the LWC Regional Study Area.

LWC Project Study Area

The natural terrestrial habitats within the LWC Project Study Area are isolated from each other by industrial lands associated with the WWTF and the hardening of the shoreline. East-west connections along the shoreline and via offshore aquatic habitat may offer limited connectivity; however, uninterrupted terrestrial connections do not exist. North-south connections are limited to riparian habitat along the Serson, Applewood and Etobicoke Creeks. Opportunities to improve habitat connectivity through ecological restoration activities are noted as an enhancement opportunity in the Marie Curtis Park Terrestrial Biological Inventory and Assessment completed by TRCA (TRCA 2012).

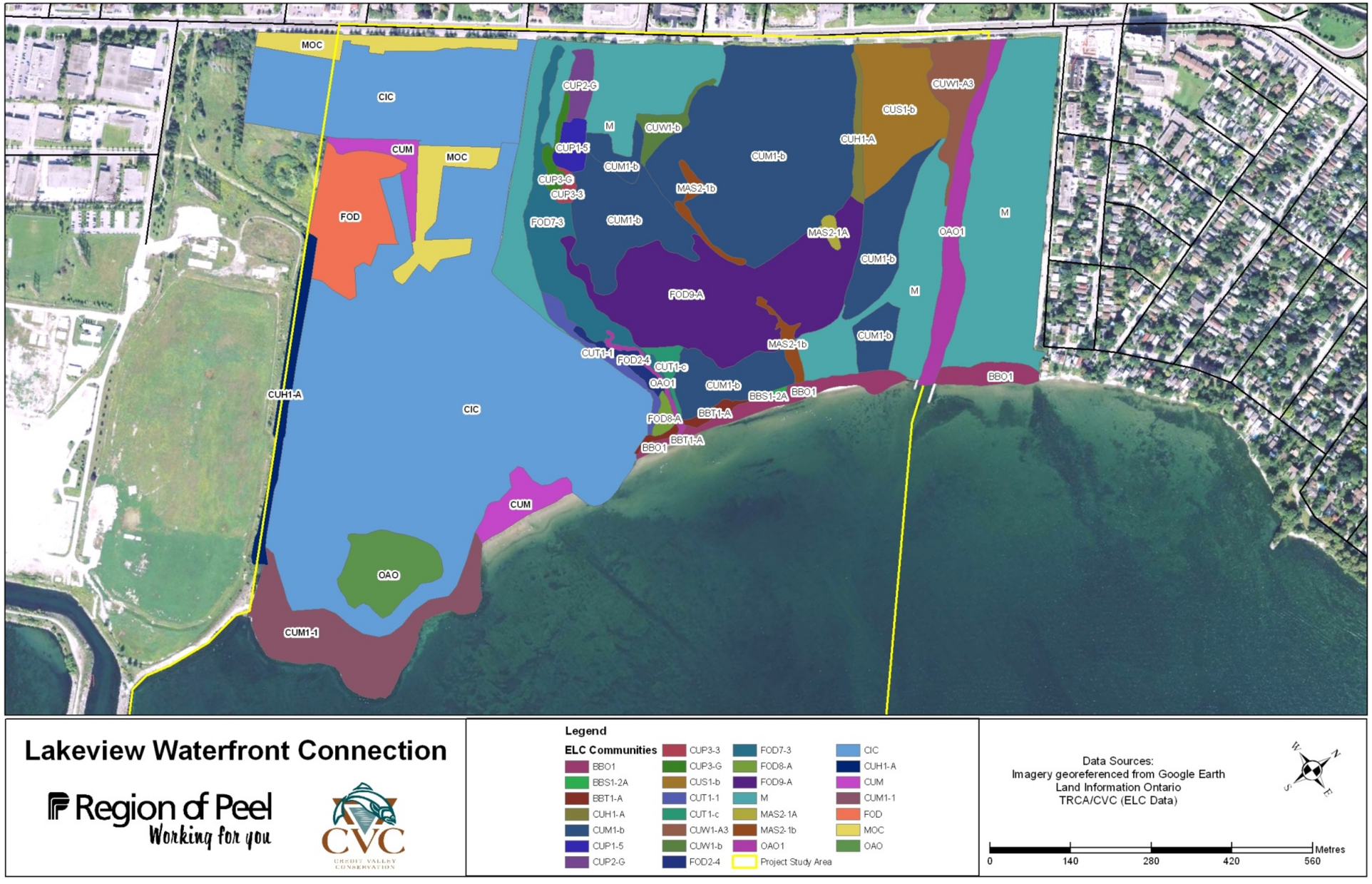
The vegetation communities within the LWC Project Study Area were delineated and identified to discrete vegetation types following the Ecological Land Classification (ELC) system for Southern Ontario (Lee *et al*., 1998). ELC is a tool developed by the Ontario Ministry of Natural Resources (MNR) which enables the interpretation of the diversity of vegetative community types within a natural area in a standardized manner. The vegetation communities within the LWC Project Study Area are shown in Figure 3.17. Table 3.3 summarizes these natural and semi-natural[5] communities.

Table 3.3 Summary of Vegetation Communities within the LWC Project Study Area

	Vegetation Community	Number of Vegetation Community Types	Area (hectares)
Natural	Deciduous Forest	5	13.2
	Beach with a Treed Beach Ridge	3	1.5
	Marsh	2	0.7
Semi-natural	Plantation	4	1.3
	Woodland	2	1.8
	Savannah	1	2.8
	Hedgerow	2	1.5
	Thicket	2	0.7
	Meadow	1	17.2

[5] Semi-natural communities are those that are, or have been, disturbed by human activities or development and are in various states of succession.

Figure 3.17 Vegetation Communities within the LWC Project Study Area



A total of twenty one unique vegetation community types are represented in the LWC Project Study Area. Nine of the twenty-one ELC communities within TRCA jurisdiction (i.e. the eastern half of the Project Study Area) are considered of conservation concern[6] (TRCA 2012) and one could potentially be considered a 'Rare Vegetation Community' according to the recommended criteria in the Region of Peel Significant Woodlands and Significant Wildlife Habitat Study (North-South Environmental *et al*. 2009). A complete list of all flora species observed in the LWC Project Study Area is provided in Appendix B, Table B-2.

3.2.2.1 Forest Habitat

LWC Regional Study Area

Forest is the dominant habitat type in Southern Ontario, and harbours much of the region's biological diversity, ranging in scale from genetic material to species and communities (Larson *et al.* 1999). In intensely urbanized parts of the region, including the LWC Regional Study Area, forests account for relatively little of the landscape; however, they can perform a number of ecological, economic, cultural and social services (MNR 1999).

LWC Project Study Area

There are approximately 13 ha of forest habitat within the LWC Project Study Area. These communities are associated with Marie Curtis Park, Arsenal Lands and the WWTF and comprise some of the only forested habitat within the Applewood Creek and Serson Creek watersheds.

The mosaic of natural forests within the LWC Project Study Area is described in Table 3.4 and included in Figure 3.17. The forests and beaches were primarily classified from field work conducted by TRCA (2003, 2005, 2010 and 2013) in areas for Marie Curtis Park, the Arsenal Lands, and the eastern section of the WWTF (TRCA, 2012). Surveys were also conducted for these same properties by the Mississauga Natural Areas Survey (City of Mississauga, 2011) and additionally for the small forest on the north-west section of the WWTF site (known as NAS site LV2).

The field surveys conducted by TRCA of the Arsenal Lands, Marie Curtis Park and the eastern section of the WWTF revealed populations of trees and ground vegetation consistent with Carolinian ecosystems. Some of these species include: Shagbark Hickory (*Carya ovata*), Butternut (*Juglans cinerea*), Glaucous Honeysuckle (*Lonicera dioica*), Wood Anemone (*Anemone quinquefolia*), Wild Geranium (*Geranium maculatum*) and Witch Hazel (*Hamamelis*

[6] TRCA assesses the quality of each habitat patch through an evaluation of size, shape and matrix influence. These criteria are weighted together to determine an average measure of habitat quality that corresponds to a 'local rank' or L-Rank ranging from L1 (the highest quality) to L5 (the poorest quality).

virginiana). Forests that exhibit southerly Carolinian woodland features are becoming increasingly rare within southern Ontario (TRCA, 2012).

A forest located on the Arsenal Lands was inventoried by TRCA forestry staff in 2005. At the present time the stand seems to be converting from a forest dominated by Red Oak (*Quercus rubra*) and Sugar Maple (*Acer saccharum*) to one composed of White Ash (*Fraxinus Americana*). Trampling and compaction by human traffic are likely affecting the ability of seedlings to germinate and establish. There is also little organic matter in much of the stand.

In addition to these remnant natural forests, treed/wooded communities exist where lands have been modified for human use, or where there has been disturbance and/or restoration in the past. In the LWC Project Study Area, there are approximately 1.3 ha of plantation and another 1.8 ha of cultural woodland[7].

Table 3.4 Natural Forest Communities within the LWC Project Study Area

Vegetation Type	ELC code	Ranking	Notes	Source
Fresh - moist lowland Deciduous Forest	FOD7-3	L5	Covers much of the central portion of Marie Curtis Park	TRCA, 2012
Dry-fresh Oak Hardwood Deciduous Forest	FOD2-4	L4		TRCA, 2012
Fresh - moist Popular Deciduous Forest	FOD8-1	L5	Only exists as an inclusion in a larger forested community.	TRCA, 2012
Fresh - moist Oak-Beech Deciduous Forest	FOD9-A	L3	Covers much of the central portion of Marie Curtis Park. FOD 9s could be considered a 'Foraging Area with Abundant Mast'[8]	TRCA, 2012
Fresh - moist Cottonwood Coastal Deciduous Forest	FOD8-A	L3	Area in transition and stabilizing as forest. Jack Poplar reaching end of life. Red Oak understory developing	TRCA, 2012/2013
Dry - fresh White Pine – Oak Mixed Forest	FOM2-1	L2	Only exists as a complex community and as such is not mapped. This vegetation type is considered a 'rare vegetation community' in the Region of Peel[9].	TRCA, 2012
Fresh - moist lowland Ash deciduous forest type	FOD7-2	n/a	Present on the north-west section of the WWTF.	City of Mississauga NAS – site LV2

[7] Cultural woodlands are treed communities with lower tree canopy cover than natural forests due to disturbance, management or being in an early state of succession.
[8] See recommended criteria in the Region of Peel guidelines for Significant Wildlife Habitat (North-South Environmental *et al*, 2009).
[9] Ibid.

3.2.2.2 Beach Community Habitat

LWC Regional and Project Study Areas

The beach communities are unique communities restricted to shoreline and riverine riparian areas.

Direct access to and from beach habitats is of importance to many wildlife species including waterfowl, molluscs, insects, reptiles, amphibians, and some mammals. Hardening the shoreline impedes the movement of species between upland and lake habitats, restricts the ability of vegetation to take hold, and in many cases eliminates the potential habitat and feeding areas for waterfowl, shorebirds, and aquatic organisms.

Beach habitats also support distinctive vegetation that require sandy sediments and can tolerate disturbance from wave action. Examples of this include Sandbar Willow (*Salix exigua*), and American Sea Rocket (*Cakile edentula*); both of which are found in Marie Curtis Park.

Approximately 1.3-ha of natural, but impaired, beaches are found along Marie Curtis Park and the WWTF. These communities are described in Table 3.5 and included in Figure 3.17.

Table 3.5 Dynamic Vegetation Communities (Beach) within the LWC Project Study Area

Vegetation Type	ELC Code	Ranking	Source
Mineral Open Beach	BBO1	L3	TRCA, 2012; and CVC field observations
Willow Shrub Beach	BBS1-2A	L4	TRCA, 2012
Treed Beach Ridge	BBT1-A (inclusion for BBO1)	n/a	TRCA, 2012; and CVC/TRCA field observations 2013

At the western end of the beach at Marie Curtis Park, a treed beach ridge was identified as part of the Mineral Open Beach feature (no existing ELC designation so BBT1-A "Mineral Treed Beach" is closest). The feature was assessed in 2003 and again in 2013. The vegetation type of this feature was originally classified as a Treed Sand Dune since this was the closest official designation at that time. However, it has since been redefined by additional field work as a Treed Beach Ridge since the substrate and coastal processes do not fit the definition of a dune.*

**Note: Based on the information available to CVC at the time of writing, it does not appear that the NHIC has assessed the rarity of Treed Beach communities in Ontario; however, beaches are considered to be rare to uncommon (S2-S3) by the NHIC.*

The feature occurs at the top of an open sand beach and roughly corresponds to the highest storm surge level of lake. This is not a dune as the sand is replenished by the City of Toronto and influenced by waves rather than being formed by wind. The feature is generally degraded, with significant amounts of refuse and trampling due to pedestrian activities, and the plant community is dominated by exotic species. The dominant tree is crack willow (*Salix x fragilis / Salix x rubens*), with some Manitoba maple (*Acer negundo*) and Siberian elm (*Ulmus pumila*). The shrub and sapling layer includes red ash (*Fraxinus pennsylvanica*), red-osier dogwood (*Cornus stolonifera*), and Japanese knotweed (*Fallopia japonica*). Geographically, it is a significant feature for the western part of Lake Ontario, but ecologically, it is quite low-quality. This feature does present significant restoration opportunities.

The Mineral Open Beach feature (BBO1-1) consists of one vegetation layer (5% or less cover, <0.5 m height), predominantly cocklebur (*Xanthium strumarium*) with smartweeds (*Persicaria lapathifolia, P. pensylvanica*), evening-primrose (*Oenothera biennis*) and silver-weed (*Potentilla anserina*). The beach is artificially augmented with sand by the City of Toronto. Excavation of the surface sand revealed a composition that was a mix of particle sizes, including sand, more-or-less fine gravel (0.5-3 cm), and shingle (mostly flat stones 3-10 cm) which indicates the natural substrate is a mix of cobbles, gravels and sand (TRCA and CVC field work 2013) (Figure 3.18).

Figure 3.18 Beach Profile and Particle Size at Marie Curtis Park West

3.2.2.3 Successional Community Habitats

Successional communities are those that are defined as cultural or old-field communities. In ELC descriptions they encompass cultural meadows, cultural savannahs, cultural thickets, and cultural woodlands. Generally, these are habitats which have been created or maintained as the result of human influences or other factors. As a result of human influences, often the composition and function of the community is altered compared to more naturally derived communities. Successional communities reflect the stage of natural succession from field (i.e., cultural meadow) to sparse forest (i.e., cultural woodland). These communities are important sources of food and shelter for wildlife.

Successional communities can be important habitat for many species of wildlife, e.g., migrant butterflies require areas with abundant wildflowers that are the source of their food. Open habitats including old fields and meadows can support species of raptors who hunt prey, and species of grassland birds that require large open spaces for breeding.

Meadows, shrub thickets and sparsely treed areas are often those that support a high abundance of fall fruit and seeds. These rich food resources are often important for migrating species of birds who use shoreline areas to rest and feed before embarking on their long migration southward in the fall.

LWC Regional Study Area

Successional communities are relatively spread out in the Regional Study Area occurring on both public and private lands. Successional communities make up a considerable portion of the non-urban land use in the area west of Southdown Road. They are also clearly evident near Port Credit (i.e. the Imperial Oil lands), Jack Darling Park, Richards Memorial Garden as well as in Marie Curtis Park / Arsenal Lands. The naturalizing areas associated with RK MacMillan / Lakefront Promenade Park are the closest successional communities to the west. Approximately, 11% of the LOISS area was reported to be composed of successional communities including meadows (CVC, 2011).

To the east, TRCA land use mapping available for the Etobicoke waterfront area reveal about 6% of the area consists of meadow and successional habitat, with the vast majority of the area centralized at Colonel Samuel Smith Park, and lesser amounts between the mouths of Mimico Creek and the Humber River. Studies conducted in Colonel Samuel Smith Park in 2009 by North-South Environmental Inc., indicated the presence of several meadow types.

LWC Project Study Area

There are approximately 24 ha of successional communities within the LWC Project Study Area; the majority of this is comprised of meadow habitat (17.2 ha). The remaining successional habitat is composed of communities in various states of regeneration from meadow to forest (cultural woodland, cultural savannah, cultural hedgerow, and cultural thicket).

The successional and meadow habitats are contained mainly within the Marie Curtis Park and Arsenal Lands section of the LWC Project Study Area. A small cultural meadow community exists along the shoreline at WWTF and a narrow Treed Hedgerow exists along Serson Creek at the west border of the WWTF and the OPG's Lakeview site.

A large proportion of the Arsenal Lands and Marie Curtis Park area consists of exotic old field meadows (CUM1-b) and cultural savannahs (CUS1-b). Despite an abundance of introduced and invasive meadow species within these areas, the extensive amount of open meadow likely support a wide range of birds and butterflies. In addition, the small cultural meadow at the WWTF contains a breeding season record of a Bobolink (*Dolichonyx oryzivorus*), a SAR that usually requires large expanses of open meadow or grassland to breed.

3.2.2.4 Wetland Habitats

Wetlands are areas where the water table is at or near the surface of the land for a portion of time. Wetland communities include swamps, marshes, fens and bogs; each of which provides unique habitat for wildlife and plants. Great Lakes Coastal Wetlands are unique ecosystems whose hydrology and ecology are dictated in part by the dynamics of the lake water levels.

Wetlands provide important ecological services and support the health of the entire watershed. They provide habitat for plants and animals that depend on wet areas for part or all of their life cycle, act as water filters for pollutants, nutrients and trapping sediments, influence groundwater recharge and discharge and are important stabilizers of shoreline areas. Wetlands and the wildlife they support are sensitive to surface water and groundwater pollution.

LWC Regional Study Area

Wetland habitat in southern Ontario is no longer common. Agricultural expansion, urban development, and human disturbance have significantly reduced wetland habitat. Coastal wetlands have especially been reduced in urbanized parts of the Great Lakes due to lake filling and other forms of development.

LWC Project Study Area

An historical air photo from 1945 suggests that a significant linear open water wetland that was protected by a long barrier beach along the shore of Lake Ontario likely connected the mouths of Etobicoke, Applewood and Serson Creeks (Figure 3.19). Air photos in the mid-1950s suggested that the mouth of Etobicoke Creek had breached across the barrier beach, and by the mid-1960s, the linear wetland connecting the mouths of Serson and Applewood Creeks was lost, possibly due to the infilling by municipal waste (Figure 3.20).

There is only 0.7 ha of wetland remaining within the LWC Project Study Area. Four isolated cattail shallow marshes exist within (or border) the old field community in the former Arsenal Lands and Marie Curtis Park. A Common Reed Mineral Marsh (MAM2-a) was also observed in 2010 within the meadow community and a Duckweed Floating-leaved Shallow Aquatic (SAF1-3) community also exists, though it is mapped as in inclusion in a larger marsh community. Though all the wetlands are small in size and relatively low in diversity, they do provide the only known habitat for breeding amphibians in the LWC Project Study Area. One wetland area is associated with a low, wet seepage area within the forested community at Marie Curtis Park and forms a small tributary that outlets to Lake Ontario through the beach between Etobicoke Creek and Applewood Creek. The recorded wetland vegetation communities are summarized in Table 3.6 and included in Figure 3.17.

Figure 3.19 Aerial Photograph of Mississauga Shoreline (OPG Lakeview Site to Etobicoke Creek), 1946

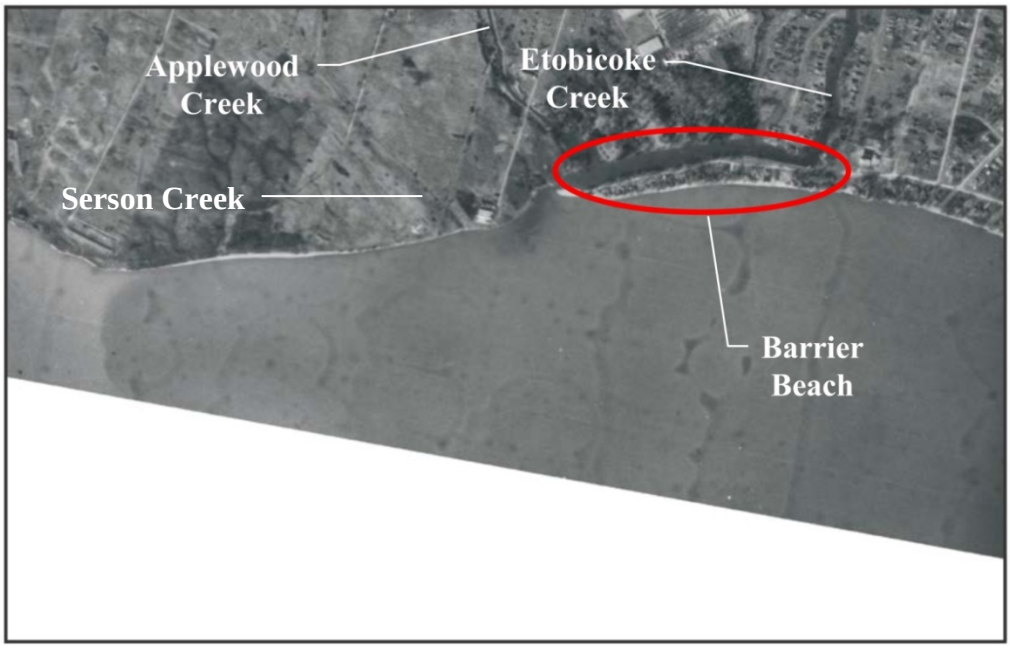


Figure 3.20 Aerial Photograph of Mississauga Shoreline (OPG Lakeview Site to Etobicoke Creek), 1954

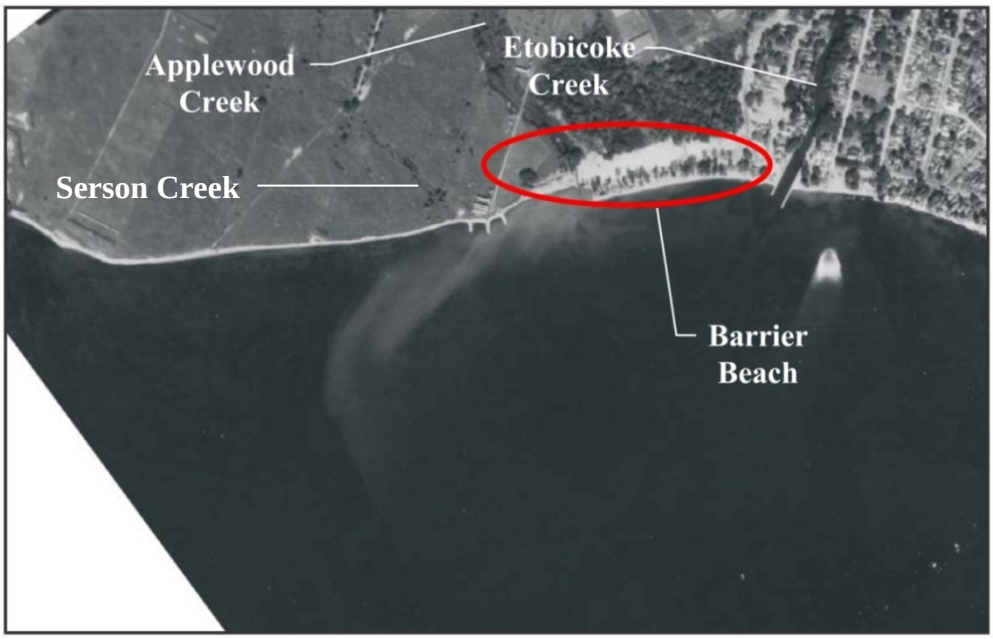


Table 3.6 Wetland Vegetation Community Types within the LWC Project Study Area

Vegetation Type	ELC code	TRCA Ranking[10]	Notes	Source
Narrow-leaved Cattail Mineral Shallow Marsh	MAS2-1B	L+		TRCA, 2012
Broad-leaved Cattail Mineral Shallow Marsh	MAS2-1A	L4		TRCA, 2012
Duckweed Floating-leaved Shallow Aquatic	SAF1-3	L4	Noted as an inclusion in a MAS2-1A community.	CVC 2010, unpublished
Common Red Mineral Meadow Marsh	MAM2-A	L+	Noted as an inclusion in a meadow community.	TRCA, 2012

In addition to the natural wetland communities, the WWTF currently contains three on-site settling ponds which may be acting as surrogate open water and wetland habitat. The largest and most easterly of the ponds includes a small willow thicket swamp. During the spring, migration has been known to support waterfowl and shorebirds which would otherwise require more natural wetland habitat to stopover, feed and rest.

[10] The only wetlands within the Project Study Area are within TRCA jurisdiction so only TRCA rankings are provided.

3.2.3 Designated Ecological Features

Designated ecological features are those areas within the Study Area that support key ecological features and functions, and/or have been identified for protection, conservation or management through various policies or programs. This category includes: Provincially Significant Wetlands, Areas of Natural and Scientific Interest, Environmentally Significant Areas and City of Mississauga Natural Area Survey Sites.

LWC Regional and Project Study Areas

Provincially Significant Wetlands

Provincially Significant Wetlands (PSWs) are wetlands identified by the Ministry of Natural Resources as being the most ecologically valuable in Ontario based on four broad categories: biological, social, hydrological and special features. Two PSW's are located in the LWC Regional Study Area (Rattray Marsh Wetland Complex and Credit River Marshes) although there are others that may meet the criteria for designation as provincially significant and these are being assessed as part of LOISS.

There are no PSWs located in the LWC Project Study Area.

Areas of Natural and Scientific Interest

Areas of Natural and Scientific Interest (ANSIs) are areas of land and water that represent significant geological (earth science) and biological (life science) features. Provincially significant ANSI's are identified by Ministry of Natural Resources (MNR) and are considered to have the highest value for conservation, scientific study and education. Two ANSI's are present in the LWC Regional Study Area (Rattray Coastal Marsh and Credit River Marshes).

There are no ANSIs located in the LWC Project Study Area.

Environmentally Significant Areas

The CVC has identified Environmentally Significant Areas (ESAs) within their jurisdiction based on their importance to ecological structure and function, and/or the value their geological features or native flora or fauna provide to society. One ESA is located within the LWC Regional Study Area (Rattray Marsh).

There are no ESAs in the LWC Project Study Area.

City of Mississauga Natural Area Survey Sites

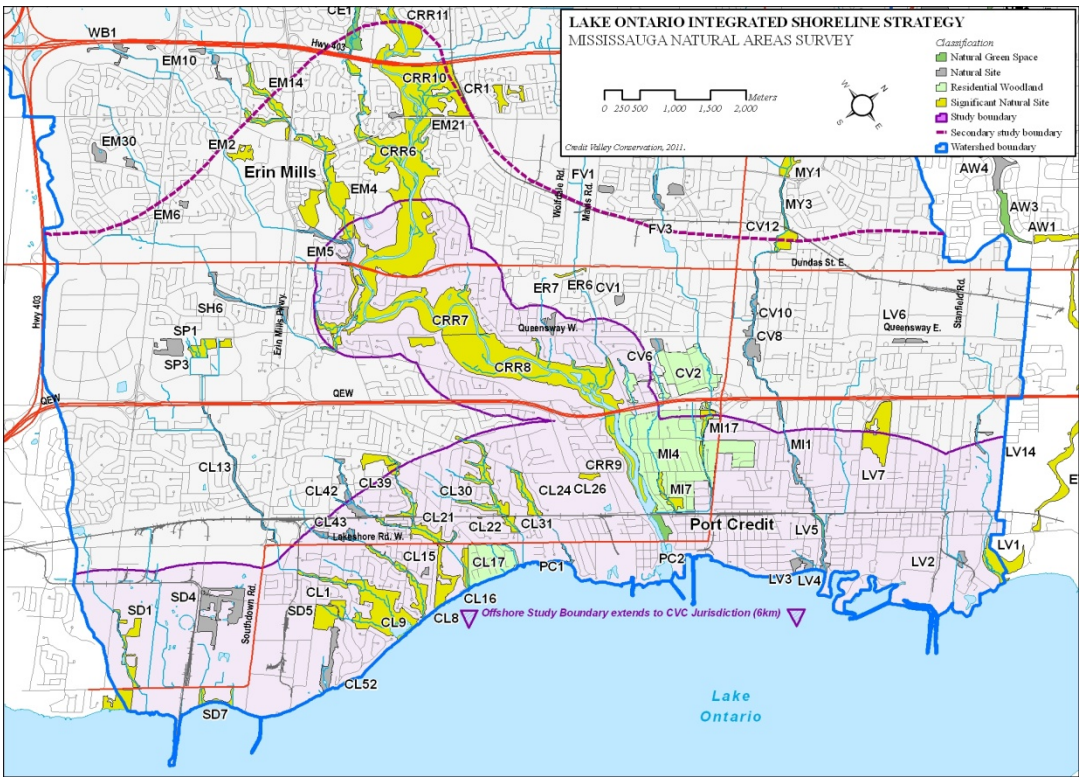
City of Mississauga Natural Area Survey (NAS) Sites are those that have been classified and evaluated by the City of Mississauga and have been shown to provide ecological functions (Figure 3.21). There are six designations under the NAS system, each of which has corresponding policies identified in the municipal official plan to encourage the protection and long term maintenance of the ecological functions they support. There is recognition that all remaining natural areas within the City of Mississauga are part of a system and that the degradation and loss of any natural area will have negative impacts on the entire system. Wherever possible, the protection and enhancement of natural areas is encouraged through land acquisition, restrictions on development, and the promotion of restoration and stewardship initiatives. The LWC Regional Study Area contains 17 NAS sites:

- Significant Natural Sites: SD1, SD7, CL1, SD5, CL9, CL8, CL16, LV1
- Natural Sites:SD4, CL52, CL15, LV3, LV2, LV4, PC1
- Natural Green Space: PC2
- Residential Woodlands: CL17

Two of these NAS Sites are located within the LWC Project Study Area:

- Site LV1 – an almost 13 ha site roughly corresponding to the portion of Marie Curtis Park, Arsenal Lands and the eastern section of the WWTF property that are within the City of Mississauga boundary. It is classified as a Significant Natural Site.
- Site LV2 – a 2.51 ha forest located at the northwest corner of the WWTF. This site is classified as a Natural Site.

Figure 3.21 City of Mississauga Natural Area Survey Sites



3.2.4 Wildlife & Wildlife Habitat

Areas identified as wildlife habitat are important functional areas for wildlife within the LWC Regional and Project Study Areas that require protection and enhancement for the species that depend on them. These areas include areas utilized by wildlife including seasonal concentration areas, rare vegetation communities or specialized habitats for wildlife, habitats for species of conservation concern and animal movement corridors.

3.2.4.1 Wildlife Corridors

Wildlife corridors are areas that are functionally or ecologically connected and provide important habitat and allow wildlife movement. Corridors can help to preserve populations of wildlife over the long term within a heavily urbanized landscape where natural communities are fragmented and dispersed.

Ensuring connectivity for all species is difficult in a fragmented landscape. However, it is essential to plan for local and regional connectivity to maintain healthy ecosystems that are resilient to disturbances. Generally, evidence suggests that habitats closer together improve the ability of the majority of species to disperse, feed, reproduce, and migrate.

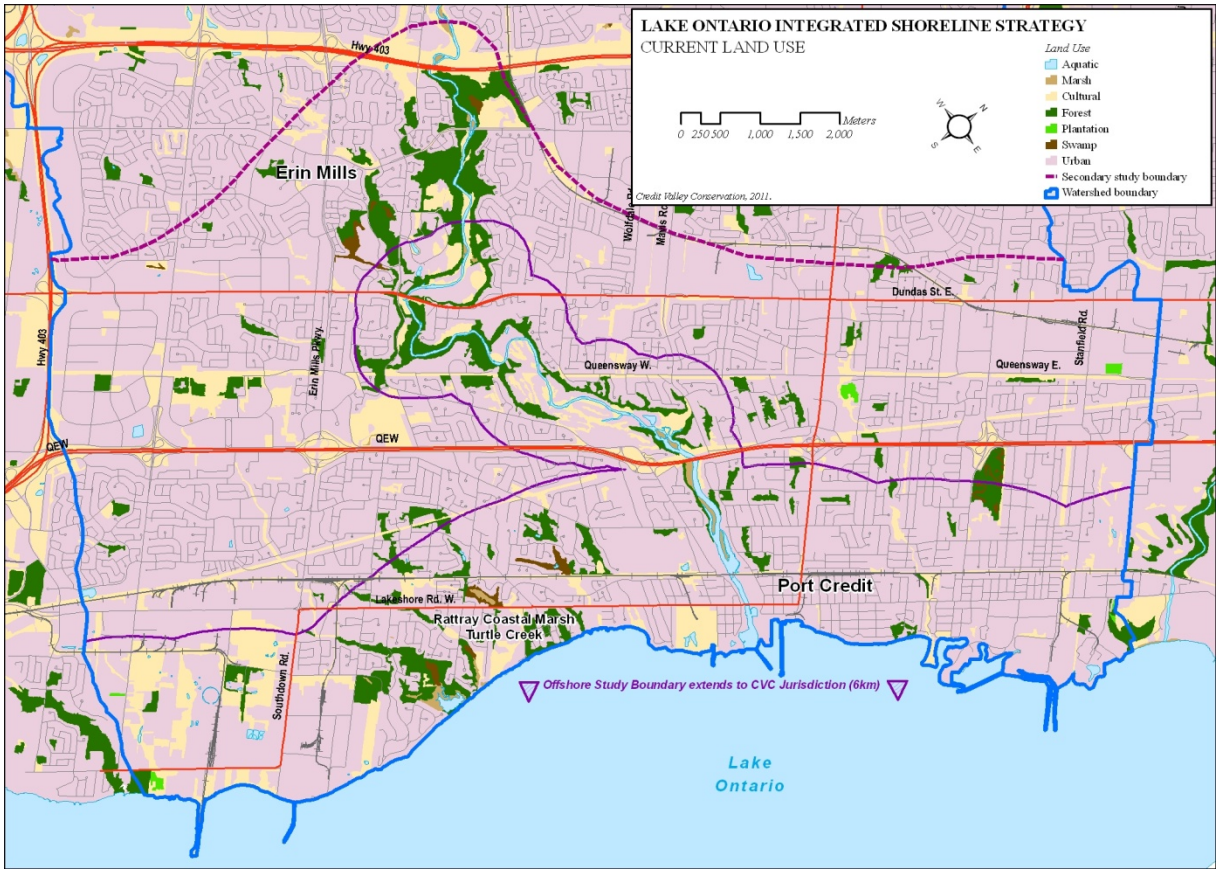
LWC Regional and Project Study Area

Wildlife migration within Mississauga and Toronto is highly dependent on critical linkages between the ravine systems and the Lake Ontario shoreline. Potential corridors and linkages in the LWC Regional Study Area have not been identified through LOISS but are expected in future stages (CVC, 2011). Many of the natural areas that exist in the LWC Regional Study Area are situated along creeks or the shoreline providing linkages for many species. Some natural areas link many different habitat types, and allow species to occupy and move between diverse habitats without many barriers. Historic (and current) disturbances to the shoreline can impact the long-term viability of fragmented populations and habitats, and can disrupt ecological connections between the terrestrial, nearshore and aquatic habitats.

Within the LWC Project Study Area, Etobicoke, Serson and Applewood Creeks and the Lake Ontario shoreline all create an essential migration corridor that facilitates the regional movement of wildlife to areas further upstream and in-land. This corridor provides important habitat for the movement of songbirds which rely on the vegetated shorelines and ravines when in need of rest, food or shelter from adverse weather conditions during migration. Additionally, this corridor offers important cover for the movement of mammalian, herpetofaunal and fisheries populations within the LWC Project Study Area.

Generally, corridors within the LWC Project Study Area are limited, and the remnant natural areas in Marie Curtis Park and at the WWTF are functionally isolated for many species of wildlife. To describe the potential for wildlife movement within the LWC Project Study Area, corridors have been categorized into several types: Riparian Corridors, Shoreline Corridors, Stepping Stone Habitat, Nearshore Corridors.

Figure 3.22 LWC Regional Study Area Land Use



Riparian Corridors

Serson Creek is highly engineered in its downstream reaches and has the potential, through restoration, to provide for a wider riparian/upland buffer to the creek linking Lake Ontario to the small woodland contained within the LWC Project Study Area. The corridor is currently highly altered and impaired.

Applewood Creek is the most naturally vegetated of the three creeks within the LWC Project Study Area; however, it lacks a significant connection beyond the LWC Project Study Area and upstream locations.

Within the Regional Study Area, the Credit River and Etobicoke Creek provide ravine systems that extend from Lake Ontario to the Oak Ridges Moraine. These corridors provide important habitat for the movement of songbirds which rely on the vegetated ravines when in need of rest, food, or shelter from adverse weather conditions during migration.

Shoreline Corridors

Shoreline corridors refer to natural features adjacent to the lake that largely consist of unhardened beaches and intact littoral zones. This provides an important east-west corridor linkage for wildlife movement, and provides stopover and staging habitat for migratory wildlife.

The remnant sandy beach south of the WWTF and beach at Marie Curtis Park provide some opportunities for wildlife movement along the shore as well as between the lake and upland areas; however, the remainder of the LWC Project Study Area shoreline is hardened, creating a barrier between terrestrial and nearshore habitats. The extensive use of fences along the shoreline of the WWTF creates further fragmentation along the shoreline corridors for both people and wildlife.

Stepping Stone Habitat

'Stepping stones' are isolated islands of natural habitat that provide landscape level connectivity to species and genetic material that can transcend the urban matrix. For many species of wildlife that cannot move through the urban matrix, these habitats are functionally isolated; however, some species of birds and mammals may be able to move over/through developed areas to other remnant natural areas. For example, the forests at Marie Curtis Park are functionally isolated from the small forest at the north-west corner of WWTF; however, many species of birds may be able to move between them.

Nearshore Corridors

Nearshore corridors are aquatic areas close to shore that provide habitat and food resources for species that move along the shore, up the river, or out to the deeper sections of Lake Ontario. With the extent of stonehooking in this portion of Lake Ontario, most of the nearshore habitat elements that may have provided this function are now absent from the LWC Project Study Area and much of the LWC Regional Study Area.

3.2.4.2 Wildlife

LWC Regional Study Area

Records of wildlife within the LWC Regional Study Area are limited, and have often been gathered incidentally rather than by directed surveys. The discussion of wildlife includes amphibians, reptiles, birds, and mammals. A total of 269 species of fauna were noted in the LWC Regional Study Area, though it is possible that many more use this area during portions of the year (i.e. migrant birds on their way to and from breeding/wintering sites) (CVC, 2011).

LWC Project Study Area

The composition of the faunal communities in the LWC Project Study Area has been assessed through the results of field surveys, observations and incidental reports of the various species groups. These wildlife observations are discussed in more detail below. In some cases the lack of consistent multi-year surveys precludes formal designations of 'significance' to be made; however, their presence indicates that inclusion is warranted.

The LWC Project Naturalization objective seeks to increase habitat and sustain diverse communities of native species.

3.2.4.3 Mammals

LWC Regional and Project Study Area

There has been no comprehensive study of mammal species in the LWC Regional or Project Study Areas. Various reports and incidental records have helped generate a list of 30 mammal species within the LWC Regional or Project Study Areas (CVC, 2011). Examples of common mammals are White-Tailed Deer (*Odocoileus virginianus*), Striped Skunk (*Mephitis mephitis*), Northern Raccoon (*Procyon lotor*) and Eastern Gray Squirrel (*Sciurus carolinensis*). Some not so common species such as Red Squirrel (*Tamiasciurus hudsonicus*) and Eastern Chipmunk (*Tamias striatus*) indicate that there are still some larger habitat patches supporting area-sensitive species. Other mammals such as American Mink (*Mustela vison*), Beaver (*Castor canadensis*) and Muskrat (*Ondatra zibethicus*) indicate the importance of the shoreline area to species that make use of both terrestrial and wetland communities. Natural areas along the lakeshore and Lake Ontario tributaries are important for the movement of these species and their ability to find adequate resources for food and shelter.

However, natural heritage surveys focused on other groups (e.g., plants, communities, birds, etc.) have revealed that there are potentially up to sixteen mammals making use of the habitat within the LWC Regional or Project Study Areas, for at least a portion of their life cycles. Appendix B, Table B-3 provides a list of the observed species, though others within the LWC Regional or Project Study Areas such as Striped Skunk can be expected. Information on mammals in the LWC Regional or Project Study Areas has been generated from:

- Terrestrial Biological Inventory and Assessment of Marie Curtis Park (TRCA field work 2003, 2011);
- Acoustic Bat Survey – WWTF (CVC field work 2011);
- City of Mississauga Natural Areas Survey Database sites LV1 and LV2 (updated 2008).

Larger mammals such as White Tailed Deer (*Odocoileus virginianus*) and Coyote (*Canis latrans*) are common visitors in the Marie Curtis Park area. These species are likely making use of natural areas within the LWC Regional and Project Study Area, particularly those along Applewood Creek and Etobicoke Creek to navigate through the urban matrix. MNR undertook tracking of coyotes within the LOISS study area and these data are being used to better understand use of the Regional Study Area by larger mammals (MNR 2012 unpublished).

Six bat species have been found within and surrounding the WWTF during a survey in 2011. There are only eight species of bats known from all of Ontario and within CVC's jurisdiction. Of the six species of bats observed, only two are particularly well adapted to urban environments: the Big Brown Bat (*Eptesicus fuscus*) and the Little Brown Bat (*Myotis lucifugus*). These species have even been known to roost in buildings during the summer and overwinter in houses or abandoned buildings.

Most bats rely on areas over open water to forage as these areas are important sources of the flying insects which make up the majority of their diet. For the insectivorous bats in Ontario, shoreline areas often provide abundant food resources in the form of invertebrates which rely on open water habitat to complete their life cycle. Sites that contain terrestrial and aquatic or wetland habitat are therefore valuable to bats.

Some bat species, like the Eastern Red Bat (*Lasiurus borealis*) and Big Brown Bat, prefer open woods and forest edges to feed. Deciduous forests with large trees are important to provide roosting/denning sites for bats like the Silver-haired Bat (*Lasionycteris noctivagans*). The LWC Project Study Area has forests, Lake Ontario and the sewage lagoons at WWTF, which provide good foraging habitat close to potential denning or roosting sites.

Three of the observed species of bats are known to be migrants to southern Ontario: Silver-haired Bat, Eastern Red Bat and Hoary Bat (*Lasiurus cinereus*). To these migrant species shoreline areas are especially important. Large bodies of water like Lake Ontario pose an impediment to migration, and bats will tend to congregate along shorelines before crossing or flying around them. Maintaining suitable habitat along shorelines will help to conserve and promote a healthy bat community.

3.2.4.4 Reptiles

LWC Regional and Project Study Area

Reptile populations in the larger Lake Ontario shoreline area have not been studied in depth. Snakes and turtles often fare poorly in urban environments due to loss of habitat. The lack of wetland habitat in the Regional Study Area and the high degree of shoreline hardening are

impediments to a robust turtle population. Restoration of shoreline areas to allow for permeable wildlife movement between aquatic and terrestrial habitats would greatly improve the potential for turtles to use the area.

Eastern Snapping Turtles (*Chelydra serpentina*) can be found in abundance in Rattray Marsh Conservation Area and along the Credit River Marshes. Observations of Northern Map Turtles (*Graptemys geographica*) have been made in the Credit River near Port Credit but the opportunity for them to disperse and use the lake as habitat has not been assessed.

The extent and viability of snake populations in the Regional Study Area is also unstudied. Incidental reports compiled in the City of Mississauga Natural Areas Survey (2011) and the TRCA (unpublished data) form the basis of the analysis. A list of the thirteen reptile species using the LOISS study area for a portion of their lifecycle is provided in Appendix B, Table B-4. There are five known turtle species (one species only exists as a historic record) and eight species of snakes (though the records for five snake species are historic).

There have been no targeted, comprehensive surveys for reptiles within the LWC Project Study Area. Incidental observations by CVC staff in 2012 indicated only one species of reptile within the LWC Project Study Area: the Midland Painted Turtle (*Chrysemys picta marginata*) using the wetland communities within Marie Curtis Park. The lack of wetland habitat in the LWC Project Study Area and the high degree of shoreline hardening are impediments to a robust turtle population.

The lack of reptile observations for the LWC Project Study Area is not surprising as reptiles often fare poorly in urban environments, where loss of habitat and conflict with humans is high. However, Gregory (2001) indicated that Eastern Garter snakes (*Thamnophis sirtalis sirtalis*) are found regularly on OPG's Lakeview site, adjacent to the LWC Project Study Area and within the LWC Regional Study Area.

3.2.4.5 Amphibians

Amphibians are key indicators of ecosystem health as most spend a portion of their life in both aquatic and terrestrial habitats. Because of this dependency on multiple habitats, amphibians are sensitive to ecological stressors and the quality of the ambient environment. Human disturbance (e.g., urban development, noise, incidental kill etc.), habitat destruction, pollution (e.g., water contamination), climate change, and alterations to the hydrologic cycle from development can have an impact on population size and health. However, some species are more resilient than others when faced with urban stresses. American Toads (*Bufo americanus*), Green Frogs (*Rana*

clamitans) and Northern Leopard Frogs (*Rana pipiens*) can generally make do with the limited and lower quality habitat and resources that is often available in urban areas.

LWC Regional Study Area

Observations made over the last 20 years indicate that the natural areas along Lake Ontario Shoreline in CVC jurisdiction and the western portion of TRCA's jurisdiction appear to only harbour seven species of frogs and toads (Appendix B, Tables B-4 and B5).

Salamander diversity and abundance within the broader Lake Ontario shoreline in CVC's jurisdiction are low. The most common salamander species is the Red-backed salamander (*Plethodon cinereus*) which has current records at 8 City of Mississauga NAS sites and historical records for another two locations. Other salamanders found in the area are the Spotted Salamander (*Ambystoma maculatum*) which occurs at two sites (one other site with a historical record). The Eastern Newt (*Notophthalmus viridescens viridescens*) is also known from one site, and has a historical record for one more area.

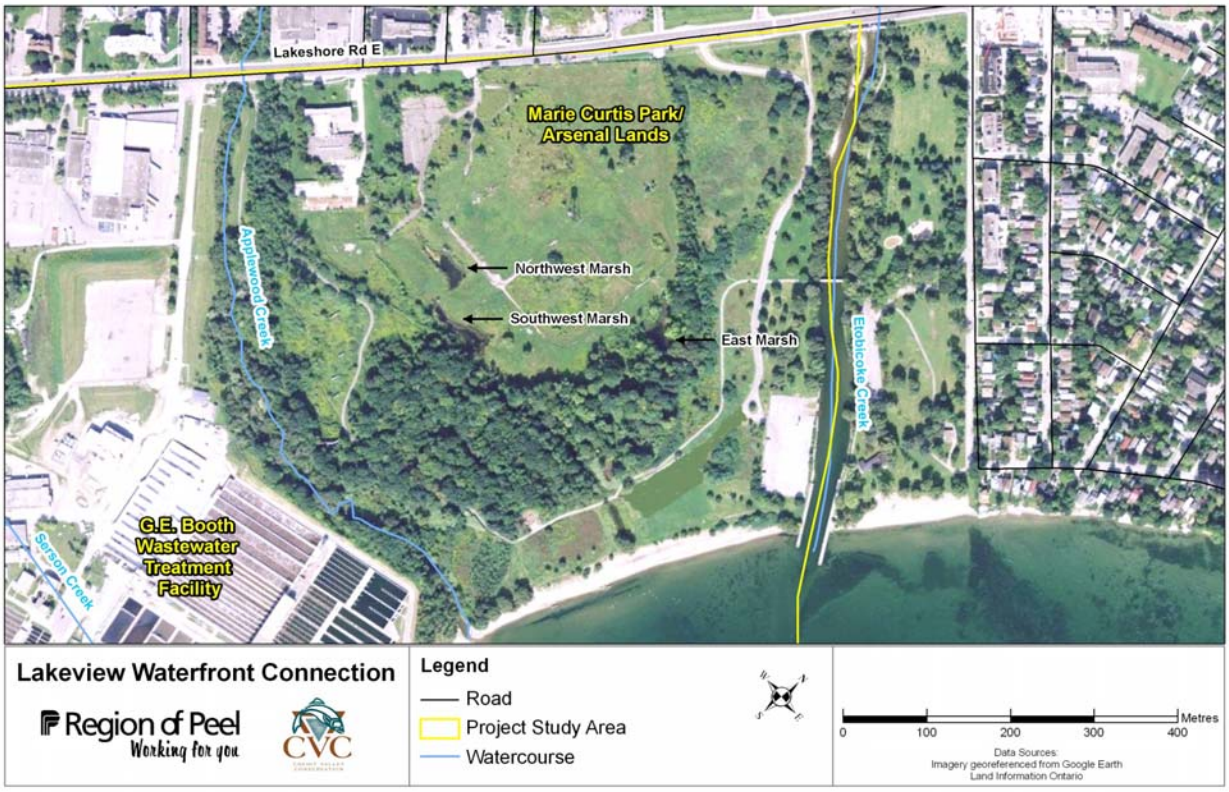
LWC Project Study Area

Suitable breeding habitat for forest and wetland breeding amphibians is limited in the LWC Project Study Area. Three small cattail marshes in Marie Curtis Park support the known breeding amphibian populations (Figure 3.23). Surveys conducted by TRCA in 2003, 2007 and 2011 and by CVC in 2009 and 2011 documented Green Frog, American Toad, Northern Leopard Frog and Gray Treefrog[11] (*Hyla versicolor*) in the 3 small cattail marshes in Marie Curtis Park, within the LWC Project Study Area. Results of these studies have been summarized in Appendix B, Table B-5. It is likely that these populations are small as only a few individuals of each species were heard on any given sampling occasion (TRCA 2012). The presence of Northern Leopard Frog is considered unique based on the urban land use that surrounds the site.

Given its size and composition, the forested habitat at Marie Curtis Park is also a potential place for forest breeding amphibians such as the Redback Salamander (*Plethodon cinereus*). Though no surveys were undertaken to determine if they are present, the disturbance caused by ad-hoc trails, mountain biking and other human impacts would likely degrade the quality of potential habitat for this species.

[11] Only one call of the Gray Treefrog was heard in 2011 by CVC staff members.

Figure 3.23 Amphibian Breeding Habitat within the LWC Project Study Area



3.2.4.6 Birds

The ecological needs of bird species differ depending on their behaviour and life history characteristics. For many groups of birds the specific habitat requirements can be readily identified and conserved based on these differences. Generally, birds can be grouped into five categories based on their ecological requirements:

- Year-round residents;
- Spring Migrants (passing through to summer territories);
- Fall migrants (passing through to winter territories);
- Breeding migrants (migrants that stay in the area to breed); and
- Wintering birds (birds that migrate from further north).

For example, migrating birds that pass through during a short window in the spring and/or fall require habitat with high concentrations of food while resident birds tend to inhabit larger territories with dispersed food sources. The protection of breeding and migratory habitat is an important consideration for the LWC Project.

Different bird groups (or guilds) use different areas of the shoreline, nearshore and in-land habitat preferentially and therefore, each must be investigated to determine how significant they may be to the local bird community:

- **Waterfowl:** prefer permanent open water making wetlands, watercourses key habitat. However, even temporarily flooded areas can play a supportive role especially during the migratory period. Upland or riparian communities play an important role for feeding, nesting and shelter. Waterfront areas are also home to species of wintering waterfowl especially where water remains open;
- **Shorebirds:** prefer to use exposed mudflats, shorelines and beaches for feeding and resting making wetland and beach habitats important. During the spring and fall, migratory species require these open areas for resting and staging;
- **Landbirds:** large, undisturbed natural forests, fields and wetlands provide the most useful habitat for these species; however, especially during migration period, smaller, marginal and less optimal habitat especially along the shoreline is often used. Manicured spaces providing adequate vegetation cover can also act as habitat for landbird migrants; and
- **Migrant:** intact riparian areas along small creeks act as corridors or funnels across the otherwise urbanized landscape. By providing continuous vegetated cover along these creeks we can help allow birds to migrate short and long distances.

LWC Regional Study Area

A comprehensive waterfowl survey was completed for the LWC Regional Study Area (CVC 2011). The LWC Regional Study Area is included in the Southwest subregion of Lower Great Lakes/St. Lawrence Plain North American Bird Conservation Region 13 (ON BCR13) (Ontario Partners in Flight, 2005). Recognizing the important habitat that exists in this region for landbirds, the ON BCR13 plan aims to guide conservation efforts for priority species of landbirds within the area, with a particular focus on forest habitats, grasslands, agricultural habitats, shrub and early successional habitats. ON BCR13 is of particular importance to the conservation of twenty Species of Continental Importance that were identified by the Ontario Partners in Flight (Ontario Partners in Flight, 2005).

Waterfront parks in the Mississauga and Toronto areas are known to play an important role in sustaining migratory bird populations. The LWC Regional Study Area is located within an important migratory zone, which encompasses both the Atlantic and Mississippi flyways. LOISS highlights the importance of the LWC Regional Study Area to migratory bird populations, and Marie Curtis Park has been identified in the Toronto Bird Flyways and Sanctuaries Project (City of Toronto, 2012).

The LWC Regional Study Area is recognized as an ecologically unique area for birds and with the identification of the Western Lake Ontario Important Bird Area (Canada's Important Bird Areas Program, 2013).

During winter months, areas with direct access to open water typically support waterfowl in the Regional Study Area (McIlveen 2009). A survey in the winter of 2008-2009 at twelve locations in the LOISS Study Area found that a great number of waterfowl are present and particularly attracted to the nearshore areas that remained ice-free. The four species present in highest numbers during the survey period were Greater Scaup, Canada Goose, Ring-billed Gull and Mallard. Other winter resident species present in relatively high numbers included Long-tailed Duck, Bufflehead, and Common Goldeneye. Of the other species encountered, the list appears to be relatively consistent with the species commonly encountered during the annual Christmas Bird Census (McIlveen 2009). Additional waterfowl surveys have been conducted by CVC as part of LOISS within both the Regional and Project Study Areas.

LWC Project Study Area

In an effort to document the birds that use the LWC Project Study Area for at least part of their life cycle, all bird observations have been combined. Records include breeding bird observations (Marie Curtis Park 2003 and 2011), migratory bird observations (Marie Curtis Park and WWTF 2011 and 2012) and other incidental observations made by TRCA or CVC during wildlife or vegetation surveys. Within the LWC Project Study Area, 157 species of birds have been observed. Of these species, six are listed as Species at Risk (Appendix B, Table B-6).

The relatively extensive forest cover within Marie Curtis Park allows for the persistence of a few area-sensitive species that require larger blocks of forest habitat. These include American Redstart (*Setophaga ruticilla*), Blue-gray gnatcatcher (*Polioptila caerulea*), Great-crested Flycatcher (*Myiarchus crinitus*), and Cooper's Hawk (*Accipiter cooperii*). Eastern Screech-owl (*Megascops asio*) was also noted by TRCA, and observations in 2011 and 2012 by CVC indicate that American Kestrels (*Falco sparverius*) may be nesting within the park. Unfortunately, due to the heavy prevalence of recreation and off-trail use, many of the birds that nest on the ground or in the understory have been impacted.

The meadows and successional areas of Marie Curtis Park support species that rely on open areas to breed; some of which are sensitive to disturbance. TRCA (2012) noted that in 2003 the community of ground-nesting birds in the open meadows included the Bobolink (*Dolichonyx oryzivorus*), and Savannah Sparrow (*Passerculus sandwichensis*); however these species have not been documented to breed since. The loss of this community of birds likely indicates a heavy level of disturbance (e.g., dog walkers within an otherwise restricted area of the park). Though it may not be currently breeding at Marie Curtis Park, records of Bobolink (SAR) from

2011 and Eastern Meadowlark (SAR) from 2012 indicate that they are still present and breeding elsewhere in the LWC Project Study Area.

Marie Curtis Park encompasses a variety of habitats (forest, meadow and beach lake front) that attracts a diverse population of birds especially during migration. The mature forest community hosts a population of woodland warblers. Uncommon birds such as Wilson's Warbler (*Wilsonia pusilla*), Blackpoll Warbler (*Dendroica striata*) and Yellow-bellied Flycatcher (*Empidonax flaviventris*) were common during the 2011 spring migration period. The Blue-Gray Gnatcatcher (*Polioptila caerulea*) was confirmed breeding in the forest. Along the beach front Red-necked Grebes (*Podiceps grisegena*) flock and forage offshore. The open meadow with shrub cover features an old water tower from which a Red-tail Hawk (*Buteo jamaicensis*) and an American Kestrel have been observed perching. Willow flycatchers, Tree Swallows and Eastern Kingbirds (*Tyrannus tyrannus*) have been seen foraging over the ponds. Maintaining the diversity in vegetation communities at this site will help to conserve the local bird community.

The sewage lagoons of the WWTF attract a variety of bird guilds. A small Bank Swallow (*Riparia riparia*) breeding colony of approximately 22 burrows was located within the eroding bank of the fly-ash material on the easternmost settling pod (Figure 3.24). This colony was one of only two known Bank Swallow colonies within Mississauga confirmed in 2011 as part of a CVC survey; however, observations in 2013 determined that this bank has since become overgrown with vegetation and is no longer occupied by bank swallows. Although the location of the colony and the material in which the burrows were made was not ideal, this feature is unique.

Figure 3.24 Bank Swallow Burrows in Fly-ash Material, WWTF
Photo: K. Vande Sompel, CVC

As observed during CVC's 2011 and 2012 surveys, the WWTF lagoons also host an array of resident waterfowl including nesting Trumpeter Swans (*Cygnus buccinator*) and a pair of Northern Shovelers (*Anas clypeata*). A variety of migratory and resident shorebirds have been observed along the lagoons mud flats. Several visits to the lagoon have revealed a breeding pair of Spotted Sandpiper (*Actitis macularius*), flocks of migratory Least Sandpipers (*Calidris minutilla*), Dunlins (*Calidris alpina*) and Pectoral Sandpipers (*Calidris melanotos*). A few uncommon transient species were also observed, including Ruddy Turnstone, Baird's Sandpiper and Wilson's Phalarope.

During the 2011 and 2012 spring and migration period, the forest in the northwest corner of the WWTF also was also surveyed and found to host a diversity of birds (72 species) many of which were migrants, including an array of woodland warblers (15 species) and other songbirds. Its proximity to the shoreline and key migratory bird corridors likely means that many species of birds use this area as a stopover ground to rest and wait out inclement conditions.

The cultural meadow that exists on the berm between Lake Ontario and the WWTF sewage lagoons hosts a variety of birds: Bobolinks, Savannah and Vesper Sparrows, Willow Flycatcher (*Empidonax traillii*), and other grassland bird species.

The WWTF buildings and structures provide plenty of opportunities for urban birds to nest. Barn Swallows (*Hirundo rustica*), a threatened species of insectivorous bird, were observed frequenting the grounds of the WWTF foraging and roosting. No visible nests were detected but evidence of breeding activity (i.e., carrying food and the presence of fecal sacs) was observed.

3.2.4.7 Butterflies and Odonates

LWC Regional Study Area

Over 100 species of butterfly have been observed in the Greater Toronto Area (Harrison 2007), which may be found in the Regional Study Area. The majority of these species are residents who live, breed and over-winter in the GTA. Approximately eleven species are known to be 'seasonal colonists' immigrating to the area in the spring to breed. Other species also have migratory tendencies and the GTA is occasionally visited by 'accidental' migrants. In the fall, other species of butterflies make the journey from southern Ontario to areas further south. The most familiar of these is the Monarch (*Danaus plexippus*); however, other common migrants include: Painted Lady (*Vanessa cardui*); American Lady (*Vanessa virginiensis*); Red Admiral (*Vanessa atalanta*); Mourning Cloak (*Nymphalis antiopa*), and Question Mark (*Polygonia interrogationis*).

The size of Lake Ontario presents an obstacle to butterfly and odonate migration. As a result, migratory species tend to congregate in shoreline areas to rest, feed, and engage in activities pertaining to migration either before their flight over/around Lake Ontario or thereafter. The habitat quality and available resources of sites along Lake Ontario are important factors in maintaining a viable population of resident and migrant butterflies and odonates. Butterfly and odonate surveys were conducted as part of LOISS.

LWC Project Study Area

Marie Curtis Park showed the highest diversity of butterflies (nine species) out of twenty survey locations (McIlveen 2010). Marie Curtis Park also supported the highest numbers of observed Monarch butterflies, likely because of the large patches of Common Milkweed (*Asclepias syriaca*), Goldenrods (*Solidago spp.*), Asters (*Symphyotrichum spp.*) and Thistles (*Carduus spp.*) (McIlveen 2009).

Incidental observations have noted that there are at least sixteen species of butterflies and eleven species of odonates observed in the LWC Project Study Area. Odonate and Lepidoteran surveys were completed in 2013 at WWTF and found several migratory species including monarch butterflies (*Danaus plexippus*), black saddlebags (*Tramea lacerate*), and green darners (*Anax junius*). Some are migrants, others breed in the area and these are listed in Appendix B, Table B-7.

3.2.4.8 Species of Concern

Species of Concern include plants and animals identified in provincial and federal species at risk legislation and through regional and municipal natural heritage strategies as Species of Concern.

LWC Regional and Project Study Area

Species of Concern have not been documented comprehensively across the entire study area. However, the LOISS background study documented Species of Conservation Concern which has a considerable overlap with the Regional Study Area. Wildlife records indicate that 128 Species of Concern were recorded (CVC, 2012). Of these species of conservation concern, there are 25 faunal species at risk known to occur in the Study Area either currently or historically. For the purposes of conservation and protection of these species at risk the specific locations in which they are found have not been recorded. Floral records indicated 265 Species of Concern were recorded.

Thirteen species at risk have been observed within the LWC Project Study Area (Appendix B, Table B-8).

3.2.4.9 Invasive Species

LWC Regional and Project Study Area

A thorough survey of all natural features in the Regional and Project Study Areas has not been undertaken. However, as with many highly disturbed urban natural areas, invasive species are common in the Regional and Project Study Areas.

Information on the presence, abundance and impacts of invasive species was drawn from terrestrial natural heritage studies conducted on the Arsenal Lands (2005) and Marie Curtis Park (2003 & 2010) by TRCA staff, and the Mississauga NAS and the Credit Valley Conservation Terrestrial Ecological Land Classification report (NRSI 2009).

Forested areas in Marie Curtis Park are dominated by Garlic Mustard (*Alliaria petiolata*), Japanese Knotweed (*Polygonum cuspidatum*), and Tartarian Honeysuckle (*Lonicera tartarica*). The beach component of Marie Curtis Park is predominantly devoid of vegetation; however, vegetation is dominated by non-native Crack Willows (*Salix fragilis*), Manitoba Maple (*Acer negundo*) and Black Locust (*Robinia pseudoacacia*). The exotic old field meadows found in Arsenal Lands and Marie Curtis Park also contain populations of Dog-strangling Vine (*Cynanchum rossicum*). Moist areas include Narrow-leaved Cattail (*Typha angustifolia*) and Common Reed (*Phragmites australis*) which can out-compete native species ultimately reducing native biodiversity and altering the community structure.

The forest on the north-western part of WWTF also contains populations of invasive species including Garlic Mustard, Buckthorn (*Rhamnus cathartica*), and Tartarian Honeysuckle.

3.2.5 Geology and Soils

The ground under which the LWC Project Study Area lies will influence the physical, chemical and hydrological characteristics of the Project as follows:

- Physical – impacts the stability and erodability of the shoreline, river banks and availability of sediment sources for transport within the area; impacts the underlying cohesiveness of the nearshore substrates and table lands as it relates to slope stability, development of foundations and structural key-ins.
- Chemical – identifies whether contaminants are present and available in the context of impacts on biota current and anticipated; identifies the soil constituents that are appropriate for establishing potential vegetation communities.
- Hydrological – identifies the mobility of groundwater through the surficial layers and discharges to created habitats to determine volumes and quality.

An environmental investigation was conducted to obtain current information on the environmental conditions of the soil and groundwater adjacent to the proposed development area located south of the WWTF. Sampling locations are shown in Figure 3.25. The results of the investigation have been used in the EA to inform assessment of Alternative LWC Project Configurations ('Alternative Methods') as well as the detailed assessment of the Preferred Alternative.

Figure 3.25 Sampling Locations for Soil and Groundwater Investigation

3.2.5.1 Geological and Hydrogeological Setting

LWC Regional and Project Study Areas

Both the LWC Project Study Area and LWC Regional Study Area are underlain by shale bedrock of the Georgian Bay Formation. The uppermost weathered zone of the shale bedrock was encountered within the supplementary environmental investigation at depths of 5.94 and 12.81 metres below ground surface (mbgs) corresponding to elevations of 70.98 to 71.17 metres. The Georgian Bay Formation is grey shale that is up to 175 m thick, with fracturing limited to the upper few metres of the Formation.

Approximately, 9 ha of the WWTF consists of land created in the late 1950s to expand the site southward into Lake Ontario to accommodate the construction of additional sewage lagoons as well as a much smaller area at the southeast corner to accommodate the inclusion of additional treatment tanks. Based on the stratigraphic information collected during the supplementary environmental investigation, the near shore soils comprise a combination of lakefill and fill soils that comprised sand and gravel and silty sand to sandy silt for thicknesses of 2.4 to 4.3 mbgs. Silt and sand were identified on a very local scale. The majority of the fill was devoid of material inclusions such as concrete, asphalt, wood, metal and glass except for very localized instances of asphalt fragments. No staining, odours or sheens were associated with the fill materials except for a presence of a petroleum hydrocarbon odour identified in two instances.

Within the western-most part of the near shore environment, substantially greater thicknesses of fill (8.5 to 10.3 m) were reported, the majority of which was represented by a reddish, powdery ash, generated from the WWTF incinerator process that forms a pronounced ridge.

Farther inland in the vicinity of the proposed Serson Creek realignment, lesser thicknesses of fill were encountered ranging from 0.61 to 1.83 mbgs, comprising sandy silt to sand and gravel. The greater thicknesses of fill were reported where the bedding material of a former rail spur occurs at the western end of proposed Serson Creek realignment route. No evidence of environmental impacts was reported in the fill in this area of the LWC Project Area except for a faint septic odour identified in one location in sandy silt fill.

The native soil underlying the LWC Project Study area, as identified through the supplementary environmental investigation, ranged from sandy silt to sand and gravel and layers of silt to sandy silt till. No evidence of environmental impacts was reported in the native soils.

Groundwater levels in both the LWC Project Study Area and LWC Regional Study Area are influenced by the close proximity of Lake Ontario and fluctuations in lake levels with the effects being most apparent with closer distances to the lake. Based on groundwater measurements

collected in early August 2013, groundwater flows toward the lake with a relatively modest lateral gradient of 0.027. Depths to groundwater ranged from 1.36 to 8.08 mbgs m near the lakeshore and 4.99 to 6.39 mbgs further to the north within the proposed Serson Creek realignment (a distance of 400 to 700 m from the lake).

Marie Curtis Park includes approximately 13.4 ha of municipal refuse under a thin veneer of topsoil. Although the landfill is located east of proposed in-water works of the LWC Project, depending on the nature of the tie-in approach and location of the eastern limit of the land creation, there may be geoenvironmental or geotechnical considerations to be accounted for in the design of the LWC Project.

It does not appear that significant infilling has occurred on the Arsenal Lands. The soils are expected to comprise mostly native silty clay and clayey silt tills (MNR, 1980). An extensive soil remediation program was completed in the 1990s, with the clean-up completed to meet the provincial generic standards for residential/parkland land use in effect at that time. A Record of Site Condition for the remediated property was filed on the MOE's Environmental Site Registry June 12, 2002 with further information provided on October 23, 2002. MOE provided acknowledgement of the RSC on November 8, 2002. MOE submitted acknowledgement of Filing of the Transition Notice on June 12, 2007.

3.2.5.2 Soils Testing

Soil samples were collected at each borehole and groundwater monitoring well location and tested for a selection of potential contaminants including inorganic substances, petroleum hydrocarbon compounds (PHCs), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs).

The results of the testing of fill and native soil along the shoreline adjacent to the LWC Project Area identified a number of instances where the soils did not meet the applicable Ministry of the Environment (MOE) Site Condition Standards (SCS). These results were largely represented by metals along with electrical conductivity (EC) and sodium absorption ratio (SAR) reported in fill. Very localized concentrations of PHCs and PAHs were also reported. The source of these soil impacts is attributed to the environmental condition of the fill used for land creation to accommodate the past expansion to the WWTF. It is understood that land creation and construction of the naturalization features will not involve the disturbance of any of the existing land mass beyond the possible removal of armour stones where it is installed along portions of the existing shoreline.

No reported concentrations of inorganic parameters, PHCs, PAHs or VOCs were reported in soils analyzed from boreholes MW12-11 to MW12-16 except for a reported concentration of cadmium reported in fill at MW12-14 (Figure 2.25). The extent of this one instance has not been delineated but, based on the balance of the results reported, is not a significant concern to the proposed habitat creation.

3.2.5.3 Groundwater Testing

Groundwater samples were collected at each borehole and groundwater monitoring well location and tested for inorganic substances, PHCs, VOCs, PAHs and PCBs. The primary concern with regards to the development of new terrestrial and wetland habitat is the potential for the migration of contaminated groundwater discharging into these areas, whether the source of the groundwater contamination is from the near shore soil conditions or from some other sources further upgradient.

Testing of groundwater from the wells installed along the shoreline did not report any concentrations of analytes that exceeded the applicable generic MOE SCS for groundwater within 30 m of an open water body (Table 9 SCS) except for one instance of F3 PHCs (530 µg/L versus 500 µg/L) reported in one well installed at the western end of the LWC Project Study Area. The MOE SCS for F3 PHCs in groundwater is not an ecological-derived or human health-derived risk-based value. The MOE SCS has been established based upon the relatively low solubility of F3 PHCs in groundwater and thus the potential for the formation of non-aqueous phase liquid (NAPL). It should be noted that no evidence of a NAPL was identified within the LWC Project Study Area and thus, the result reported is not considered to be a significant concern warranting further remedial or mitigative action.

Groundwater testing of the monitoring wells located within the proposed Serson Creek realignment did not report any concerns with all analysis meeting the applicable MOE SCS.

3.3 SOCIO-ECONOMIC ENVIRONMENT

3.3.1 Land Use

The land use descriptions in this section are based on the existing Mississauga Plan (City of Mississauga, 2003) and the Toronto Official Plan (2002, consolidated in December 2010). However, the policy review for Lakeview and Port Credit within the City of Mississauga is currently underway and will involve formulating Official Plan policies for the Lakeview and Port Credit Communities and the preparation of zoning by-law amendments, urban design guidelines, and special site policies. A draft version of the Port Credit Local Area Plan is available, and information from this document has been included as appropriate.

3.3.1.1 Planned Land Use

Planned land use describes the land use designations which are included in the Mississauga Official Plan (MOP 2012) (City of Mississauga, 2012) and the Toronto Official Plan (2002, consolidated in December 2010). Some sections of the MOP (2012) are currently being appealed at the Ontario Municipal Board and the Mississauga Plan (2003) remains in effect for those areas under appeal. This section does not include land uses envisioned by other planning initiatives such as Inspiration Lakeview and Inspiration Port Credit. A description of these initiatives is provided in Section 3.3.1.3 (Future Land Uses).

LWC Regional Study Area

According to the Mississauga Official Plan (City of Mississauga, 2012), land use and development within the City is guided by the various elements of the City Structure. These elements include:

- Downtown;
- Major Nodes;
- Community Nodes;
- Corporate Centres;
- Neighbourhoods;
- Employment Areas; and
- Special Purpose Areas.

Elements that are within the LWC Regional Study Area include three community nodes (Clarkson Village, Port Credit and Lakeview), three neighbourhoods (Clarkson-Lorne Park, Port Credit, and Lakeview), and two employment areas (Southdown and Lakeview).

Land use designations in Southdown include large Utility and Business Development areas, Utility, and areas of Public Open Space/Greenbelt along the waterfront and adjoining watercourses.

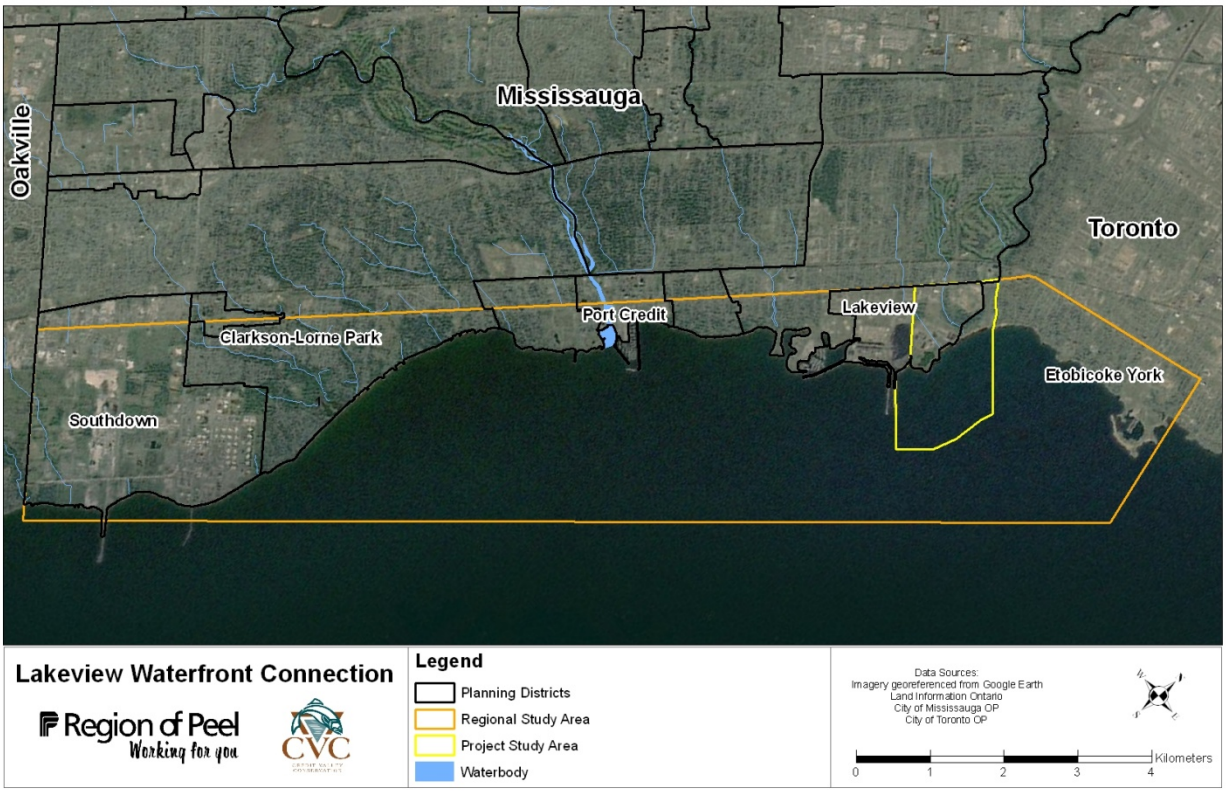
Clarkson-Lorne Park is largely Low and Medium Density Residential, with various amounts of Public Open Space/Greenbelt and Commercial. A sizeable area south of the QEW, between Winston Churchill Boulevard and Southdown Road is designated Business Employment.

Port Credit, centred around Lakeshore Road West, is designated as a mix of Low, Medium and High Density Residential, Commercial, and Public Open Space/Greenbelt. A few parcels of land adjacent to the CN Railway along Queen Street and Queen Street West are designated Business Employment. The Port Credit Local Area Plan describes the future development of Port Credit as an “urban waterfront village”, based on the principles of a mixture of land uses, a variety of

densities, pedestrian and cycling friendly infrastructure, transit and supportive urban forms, a significant public realm, and public access to the waterfront.

Lakeview is largely Low and Medium Density Residential, with large areas of Public and Private Open Space/Greenbelt and Utility (OPG's Lakeview site and Lakeview Water Treatment Plant). Land along Lakeshore Road West is mostly designated Commercial and Business Employment.

Figure 3.26 Planning Districts in the LWC Regional Study Area



In November, 2007, the City of Mississauga initiated a review of the Lakeview and Port Credit District Policies, culminating in the "Lakeview and Port Credit District Policies Review and Public Engagement Process – Directions Report" in November, 2008. This resulted in the Port Credit Local Area Plan and Built Form Guide which is currently being finalized by the City of Mississauga's Policy Planning Division and the preparation of the Lakeview Local Area Plan (2012). Policy recommendations resulting from these plans will be incorporated into the new Port Credit and Lakeview Local Area Plans which will form part of the Mississauga Official Plan (2012).

The eastern portion of the LWC Regional Study Area falls within the Etobicoke York District in the City of Toronto (Figure 3.26). The dominant land use designation is "Neighbourhoods" with "Parks" representing the second most dominant land use. A small strip of land buffering Etobicoke Creek is designated as a "Regeneration Area" and two adjoining areas in the far eastern portion of the LWC Regional Study Area are designated as "Institutional Areas " and "Other Open Space Areas (such as Golf Courses, Cemeteries, Public Utilities)".

LWC Project Study Area

The LWC Project Study Area includes lands within both the City of Mississauga and the City of Toronto. Within the City of Mississauga, the WWTF land is designated Utility, with the area north of the WWTF designated Business Employment. The Arsenal Lands are designated Public Open Space, while the lands along Serson and Applewood Creeks are Greenbelt (Figure 3.27). Within the City of Toronto, Marie Curtis Park is designated Park.

According to the City of Mississauga's Zoning By-law and the City of Toronto Official Plan, land within the LWC Project Study Area is zoned as shown in Table 3.7, with permitted uses.

Figure 3.27 Designated Land Use within the LWC Project Study Area

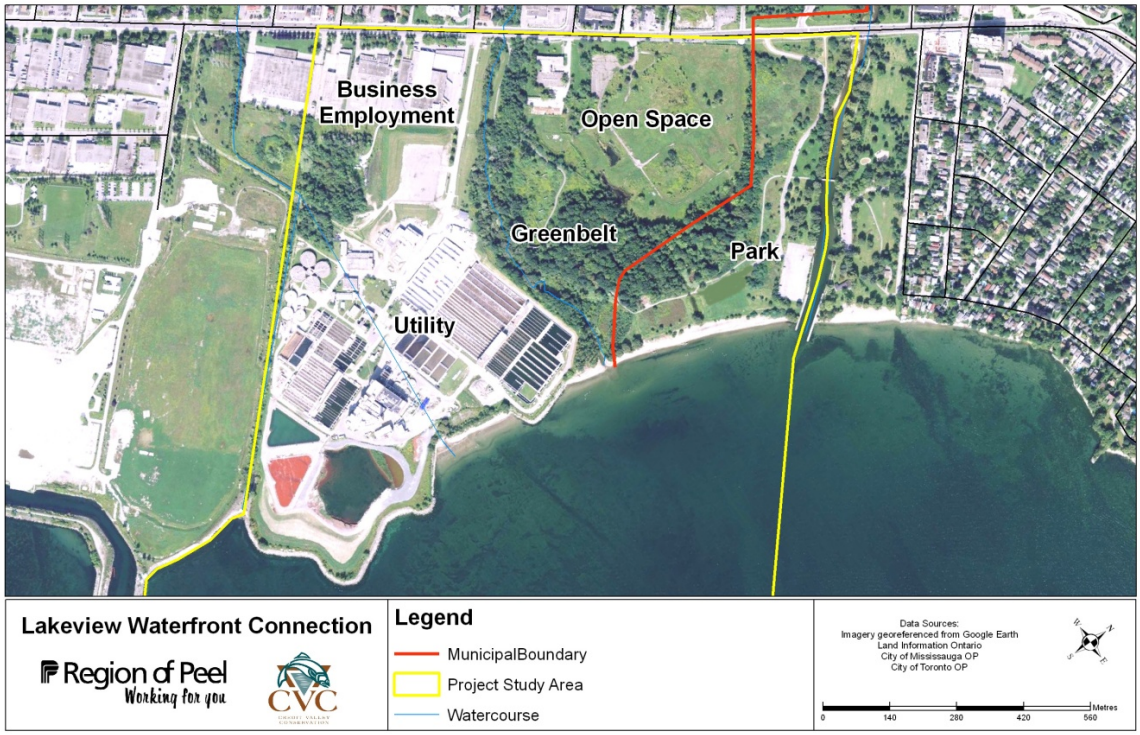


Table 3.7 LWC Project Study Area Zoning

Area	Zoning Codes (Meanings)	Permitted Uses
WWTF	U-1 (Utility Zone - 1) – City of Mississauga	Passive recreational use; utility building; water treatment facility, sewage treatment plant; electric transformer and distribution facility; power generating facility and associated outdoor storage
	G2 (Greenbelt – Natural Features) – City of Mississauga	Natural protection area; natural heritage features and areas conservation
Marie Curtis Park/Arsenal Lands	G1 (Greenbelt – Natural Hazards) – City of Mississauga	Flood control; stormwater management; erosion management; natural heritage features and areas conservation
	OS2 (Open Space – City Park) – City of Mississauga	Passive and active recreational use; stormwater management facility
	Parks – City of Toronto	To be maintained in a primarily natural state while allowing for compatible recreational, cultural and educational uses and facilities that minimize adverse effects on natural features and functions; and conservation projects, public transit, public works and utilities for which no reasonable alternatives are available, and that are designed to have only minimal adverse impacts on natural features and functions
Commercial area	E2-21 (Employment) – City of Mississauga	A variety of office uses, business activities, and commercial facilities. Uses that are not permitted include power generating facility, waste processing facility, motor vehicle repair facility, composting facility, night club, adult entertainment establishment, etc.
Serson and Applewood Creeks	G1 (Greenbelt – Natural Hazards) – City of Mississauga	Flood control; stormwater management; erosion management; natural heritage features and areas conservation

3.3.1.2 Existing Land Use

LWC Regional Study Area

Existing land uses within the LWC Regional Study Area are residential, commercial, industrial, institutional, open space/greenbelt, vacant lands (City of Mississauga, 2012), and parks (City of Toronto, 2002). Communities within the LWC Regional Study Area include Clarkson-Lorne Park, Port Credit and Lakeview in Mississauga (City of Mississauga, 2012), and Long Branch and New Toronto in Toronto (City of Toronto, n.d.). Population statistics for these communities are shown in Table 3.8, as reported in the 2001 and 2006 censuses and summarized by the Cities of Mississauga and Toronto.

Table 3.8 Population Statistics for Communities in the LWC Regional Study Area

Neighbourhood	Population (2001)	Population (2006)	% Change in Population (2001-2006)	% of Municipal Population in 2006 (Mississauga or Toronto)
Clarkson-Lorne Park	39,250	39,080	-0.4%	5.9%
Port Credit	10,260	10,535	2.7%	1.6%
Lakeview	22,045	21,370	-3.1%	1.4%
Long Branch	10,385	9,625	-7.3%	0.4%
New Toronto	11,280	10,655	-5.5%	0.4%

Sources: City of Mississauga, n.d.b.; City of Toronto, 2006a, 2006b.

It is noted from the population changes presented in the table above that the communities within the LWC Regional Study Area are generally stable or slowly losing population. This population loss is likely attributable to aging families creating empty nests. The following community descriptions are based on the divisions defined by the Cities of Mississauga and Toronto.

Clarkson-Lorne Park - Clarkson-Lorne Park is a stable residential community with two distinct Character Areas - the east and west sides of Southdown Road. Lands east of Southdown Road are developed largely for detached dwellings, predominately one storey (more recent construction is generally two storeys) in height on large lots with low lot coverage and generous setbacks, resulting in a low density development pattern. The lands west of Southdown Road contain a broad range and mix of housing built on a road pattern dominated by crescents and culs-de-sac. The Clarkson Village commercial area provides a focus for the community with a mixture of street related shops, strip retail commercial/residential plazas, and a traditional shopping centre. Also, a combination of apartments and townhouses has developed in the vicinity of the GO Transit station. The community is also served by a mixture of retail commercial concentrations, including those at Lorne Park Road, Clarkson Road and Truscott Drive. The area also includes some commercial and light industrial uses south of the QEW between Winston Churchill Boulevard and Southdown Road.

Port Credit - Port Credit is generally a stable area with a distinct community identity within the City of Mississauga, with a focus on the Lake Ontario waterfront, the harbour and its heritage. The community is anchored by established residential areas at the eastern and western parts, and is served primarily by a commercial corridor along Lakeshore Road. Port Credit's heritage can be found in the unique buildings in and around the harbour area and the Lakeshore Road commercial areas. Port Credit's location makes the community a focal point of residential, commercial, open space and tourism and recreation activity on the Mississauga waterfront.

Residential development consists of a combination of dwelling types and forms comprising a high density area centrally located near the Port Credit GO Transit Station, medium and high density development along Lakeshore Road, as well as low density areas characterized by tree-lined streets in grid patterns. As it passes through Port Credit, Lakeshore Road has a "mainstreet" commercial character, and is flanked by on-street parking and spacious sidewalks accommodating active pedestrian use. The street is framed by one- to two-storey buildings with small storefront shops. Small-scale industrial and commercial uses exist south of the Canadian National Railway tracks along Queen Street and Queen Street West. Most of the lands in the area are developed with the exception of the vacant Imperial Oil (formerly Texaco) lands west of Mississauga Road South. Several commercial areas are located along Queen Street and Queen Street West, just south of the CN Railway.

Other uses along the Port Credit waterfront include a working harbour, fishing, boating and marine services.

Lakeview - Existing residential land uses in Lakeview are a combination of low density detached and semi-detached units, medium density townhouses and high density apartments. The high density development is primarily located south of the Canadian National Railway right-of-way along Lakeshore Road East. A large portion of the existing commercial facilities are concentrated along Lakeshore Road East. OPG's Lakeview site and the Lakeview Water Treatment Plant, situated south of Lakeshore Road East, comprise a major portion of the Lake Ontario shoreline within Lakeview. An unused north-south hydroelectric power corridor (between OPG's former Lakeview site to areas north of the QEW) is the other primary industrial use in the area.

Long Branch and New Toronto - Long Branch and New Toronto are located at the southwestern portion of the City of Toronto, along Lake Ontario. The communities are defined by their proximity to the lake, and include a number of waterfront parks, as well as shopping districts along Lakeshore Boulevard. Both communities are in transition: many new home developments are being built along Lakeshore Boulevard in Long Branch, and an industrial corridor in northern New Toronto has been rezoned to residential as industry gradually moves out of the area. Within New Toronto, the City of Toronto has a Water Treatment Plant at Colonel Samuel Smith Park.

Waterfront parks within the LWC Regional Study Area include: Colonel Samuel Smith, Lakefront Promenade, Jack Darling Memorial, J.C. Saddington, AE Crookes, Douglas Kennedy, the Adamson Estate, Lakeside, and Watersedge. These parks provide a number of amenities including baseball diamonds, picnic areas, soccer fields, washrooms, concession stands, splash pads and boat launch and yacht club facilities. Many of these parks are connected by the

Waterfront Trail, which weaves along the Lake Ontario waterfront from Niagara to the Quebec border.

LWC Project Study Area

Land uses within the LWC Project Study area include the WWTF in the southwest, Marie Curtis Park and the Arsenal Lands in the east, and a Business Employment Area in the northwest, while the LWC Project Study Area is within the Lakeview District (which includes residential communities), there are no existing residential uses within the LWC Project Study Area itself (see Figure 3.25).

The Arsenal Lands and Marie Curtis Park are owned by TRCA. The Arsenal Lands site was long used for a variety of manufacturing activities, including small arms and munitions production during the Second World War. It has also been used for offices, storage, ordnance, a canteen, a Provincial weigh scale, and a firing range. It was purchased by TRCA and the Province of Ontario, City of Toronto and the Region of Peel in 1992 with ownership being transferred to TRCA for the intent of expanding Marie Curtis Park. Remediation activities were completed in 2002, though the lands remain mostly fenced off from the public. Marie Curtis Park was formerly the site of barracks and farming activities.

Conceptual master park plans for Marie Curtis Park and the Arsenal Lands indicate that the Arsenal Lands will include ponds, picnic areas, splash pad/playground, parking lots, forest regeneration zones, and other amenities. Marie Curtis Park currently has a number of recreational amenities, including a children's playground area, wading pool, baseball diamond, and beach. Redevelopment of Marie Curtis Park will include picnic areas, beach volleyball courts, a dog park, an extended trail system, and many other amenities.

The WWTF covers an area of approximately 47 ha. The plant is owned by the Region of Peel and processes the wastewater from residential and employment areas in Bolton, Brampton and the eastern parts of Mississauga as well as York Region. The WWTF has the total daily capacity of 448,000 cubic metres of wastewater. The outfall currently extends approximately 1.6 km offshore and consists of a 7' diameter pipe. Any works along the waterfront must ensure that access to the outfall be retained in perpetuity for long-term maintenance and repair.

The existing Business Employment Area includes 84 businesses, which include:

- Service providers – Oasis Convention Centre, ACA Immigration Inc., Avenue Moving and Storage Ltd., Ingersoll Rand Security and Safety Inc., Xtreme Tire Garage, McKenna Logistics Centres, Twinkle Coin Car Wash, Shomi Inc., SCA Oplenac, Richards-Wilcox Door Systems Ltd., Ontario Clean Water Agency, Nova Insurance Agency Ltd., Pippi's

World, H&R Block, Lakefront Graphix Technology, Lakefront Pet Vet Hospital, Long Branch Rental, MNF Financial and Accounting Services Inc., Money Max, Canada Post, Ecstasy Limos, Empire Group, Evergreen Health Centre Skin and Body Care, Focused on Food;

- Manufacturers – Boltron Bookbinding Ltd., Northstar Composites Inc., Long Branch Foundry Inc.; Plasterform Inc., Interior Manufacturing Group Inc., Stratos Industries Inc., Select Overhead Door Service Inc., Lakefront Manufacturing Inc., C/S Construction Specialties Company Inc., C/S Construction Specialties Company Inc., Ilsco of Canada Ltd., Toronto Fabricating & Manufacturing Company, ABC Fire Doors Testing and Manufacturing Ltd., Cintube Ltd., Filamat Composites Inc., Four Four Four Ltd., Triton Sails Ltd.;
- Suppliers – Gaspard and Sons Ltd., Specialty Gaskets Inc., Genco Marine Ltd., Kotyck Brothers Ltd.; Cosway Supplies, Metagenics Canada Inc., Wonderland Food and Equipment Inc.;
- Wholesalers and warehouses – Grohe Canada Inc., National Bait Inc., AJ Lanzarotta Wholesale Fruit and Vegetable Ltd., Canadian Food for Children, Casino Auto Wholesale Ltd., Chantler Packaging Inc., Four Four Four Ltd., Illy Caffe, Meaty Meats;
- Retail – Cango, Softcom Cell Phone Accessories;
- Restaurants – Tim Hortons, Lily's Restaurant, Lotus Island Vietnamese;
- Institutions – Peel Alternative School South; and
- Accommodations – The Ivy Motel, Green Acres Motel.

3.3.1.3 Future Land Use

LWC Regional and Project Study Areas

This section describes planning initiatives relating to the LWC Regional Study Area and Project Study Area that are currently underway. These initiatives propose redevelopment but have not been approved as part of *Planning Act* applications. These initiatives will inform and will be informed by the LWC Project planning process.

Inspiration Lakeview is a visioning process which was undertaken by the City of Mississauga, with the purpose of developing a Visionary Concept Plan to guide future development at the OPG's Lakeview site and adjacent employment lands along the Mississauga waterfront. The process included visioning sessions and presentations, with residents and key stakeholders from all over Mississauga sharing their ideas for the waterfront.

The final report outlined a vision for the water's edge, green space, cultural attractions, and urban design. This vision included creating space for Serson Creek to flow above ground and new water channels through OPG's Lakeview site; allowing for a variety of recreational

activities along the waterfront; creating both north-south and east-west green corridors; developing cultural spaces for the arts and community events; commemorating the cultural history of the area; and designing the urban landscape to support the elements described above. The full report was presented to the City of Mississauga's Planning and Development Committee on April 18, 2011, and was unanimously accepted as a key step in developing this part of the Mississauga waterfront.

Similar to Inspiration Lakeview, Inspiration Port Credit (IPC) is a process whereby the City of Mississauga is working with landowners, residents and other stakeholders on a master plan and an implementation guide for the waterfront sites. The lands being considered are the Port Credit Harbour Marina lands and the Imperial Oil Limited (formerly Texaco) lands. The process will help guide the City towards the realization of the full potential of these waterfront sites. The process was launched on May 9, 2012 by City Council, and options were presented to the community for comment and feedback on March 26th, 2013. A final community meeting is planned for the spring 2014 before the plan is submitted to City Council.

The City of Mississauga initiated the Lakeview and Port Credit District Policies Review in response to changing local circumstances and recent provincial planning initiatives. The goal of these reviews is to provide for intensification of the areas in a manner which continues to make the Lakeview and Port Credit communities desirable places to live and work. These district policies, once approved, will become part of Mississauga's Official Plan.

The Port Credit Local Area Plan describes the future development of Port Credit as an "urban waterfront village", based on the principles of a mixture of land uses, a variety of densities, pedestrian and cycling friendly infrastructure, transit and supportive urban forms, a significant public realm, and public access to the waterfront. The Lakeview District Policy Review is currently under way and a report on the draft Lakeview Local Area Plan will initiate the public consultation process in 2014.

The Canada Lands Company created a demonstration plan for the redevelopment of 1 Port Street (Port Credit Harbour Marina), an area of land and water on the Mississauga waterfront immediately to the east of the Credit River. This plan is being peer reviewed by the City as part of Inspiration Port Credit. The draft Port Credit Local Area Plan identified the site as having potential as a mixed use, water-related development that takes advantage of the site's location in downtown Port Credit and on the lake. The master plan process will involve the creation of a detailed vision for the 1 Port Street site that will ultimately set out permitted uses, densities, heights and building forms.

While the focus of Inspiration Lakeview is on OPG's Lakeview site, the process identified the LWC Project Study Area as key towards creating ecological and public linkages to and along the waterfront. The redevelopment envisioned an extension of the lands at the WWTF into the lake, to allow for the creation of a "green water's edge" which would connect the Arsenal Lands to Lakefront Promenade Park.

On the City of Toronto side of the LWC Regional and Project Study Areas, the Arsenal Lands/Marie Curtis Park West Master Plan Addendum (2007) is an update of the Arsenal Lands Park and Site Remediation Master Plan (1998). The Arsenal Lands/Marie Curtis Park West is a 15.7 ha property located south of Lakeshore Road East on the City of Toronto's eastern border with the City of Mississauga within the LWC Project Study Area. The purpose of the Addendum is to provide an overall plan which reflects the current site conditions, meets the needs of regional and local park users, addresses potential and existing safety concerns, and provides specific recommendations to direct park management and operation. Elements of the Marie Curtis Park Master Plan have been implemented in 2011, 2012 and 2013 including removal of the western most parking lot near the lake, reconfiguration of the boat launch area, resurfacing of the Waterfront Trail, installation of beach volleyball courts, installation of the "dogs-off-leash" area, installation of the water-play and kid-play areas on the east side of Etobicoke Creek, and reforestation efforts. City of Toronto is exploring the potential for establishing a bike skills park in Marie Curtis Park in 2013.

Plans by the City of Mississauga and TRCA to provide a further update to the Arsenal Lands Park Master Plan have been indefinitely postponed in 2012. TRCA is proceeding with building upgrades in the Small Arms Building in the Arsenal Lands following receipt of funding from the Region of Peel.

3.3.2 Land Ownership

LWC Regional Study Area

The majority of the LWC Regional Study Area is under the jurisdiction of the CVC. Within its jurisdiction, CVC owns approximately 26% of the Lake Ontario shoreline. The entire shoreline within CVC's jurisdiction is comprised of public lands (43%) and private lands (57%), with public lands being owned by the CVC, City of Mississauga, Region of Peel, MNR, OPG, MOE and DFO.

The eastern portion of the LWC Regional Study Area is within TRCA's jurisdiction including the Arsenal Lands within the City of Mississauga and Marie Curtis Park West in the City of Toronto. East of Etobicoke creek, the communities of New Toronto and Long Branch are predominantly residential neighbourhoods made up of privately owned land.

LWC Project Study Area

Most of the lands within the LWC Project Study Area are publicly owned by the Region of Peel (City of Mississauga side of the municipal boundary) and TRCA (City of Mississauga and City of Toronto side of the municipal boundary). The Region of Peel also leases the WWTF and a 9.12 ha of waterlot immediately south of the existing shoreline, including the WWTF outfall, from the MOE. OPG owns the waterlot east of the eastern pier as illustrated on Figure 2.4. The remaining lake within the LWC Project Study Area is considered unalienated Crown land which has not been surveyed into waterlots. Use of the unalienated Crown Land waterlots requires that they be purchased from MNR.

3.3.3 Recreation

3.3.3.1 Land Based

LWC Regional Study Area

A number of waterfront parks are located within the LWC Regional Study Area, with larger parks including Jack Darling Memorial, Saddington, and Lakefront Promenade. Public access to the Lake for recreation purposes was a significant driver of the original development by CVC of Lakefront Promenade Park beyond OPG's Lakeview site. Lakefront Promenade Park was created through lakefilling conducted by CVC and was completed in 1988 to facilitate recreation and conservation purposes, which included public and private marinas, beaches, trails and parkland area. This park, while a significant waterfront amenity, did not address connectivity along the waterfront either eastward or westward. OPG provides a recreational license for approximately 16 hectares of parkland to the City of Mississauga and a waterfront trail license for the connection of the Waterfront Trail between Lakefront Promenade Park and lands to the east of the former OPG Lakeview site. On the City of Toronto side of the LWC Regional Study Area is Marie Curtis Park east and Colonel Sam Smith Park. Both parks and surrounding areas in the LWC Regional Study Area offer recreational opportunities including walking, cycling, beach, sports fields, boat ramps, charter boats, sailing, jet skiing, paddlesports and fishing. Colonel Sam Smith Park is one of Toronto's largest waterfront parks located at the far east end on the LWC Regional Study Area.

The Waterfront Trail extends throughout the LWC Regional Study Area, either on-road or off-road.

LWC Project Study Area

Recreational opportunities within the LWC Project Study Area include: beach, walking, fishing, cycling, public boat launching, kite boarding/wind surfing, sea kayaking, nature appreciation, beach volleyball and dogs-off leash areas. The beach at Marie Curtis Park west is unofficially

used by kite boarders and wind surfers. Recent park improvements to this area have added permitting for beach volleyball from May to October. The westerly limit of this beach is also used for socially unacceptable activities.

The entire shoreline within the LWC Project Study Area is in public ownership. However, public access to and along the Lake Ontario waterfront is impeded by industrial activities of the WWTF. The WWTF is considered critical public infrastructure and operations extend to the water's edge. As such, public access across the property along the shore is restricted for security reasons.

At the eastern part of the LWC Project Study Area within the City of Toronto, Marie Curtis Park west provides public access to the waterfront for recreation. However, no connectivity exists along the shoreline between Marie Curtis Park and amenities to the west of the LWC Project Study Area (including Lakefront Promenade Park).

Lakefront Promenade Park and Marie Curtis Park are connected only by the Waterfront Trail; however the trail is forced to bypass much of the actual waterfront within the LWC Project Study Area, and includes a 650 m stretch of dedicated trail running adjacent to Lakeshore Road East between Hydro Road and the Arsenal Lands. The Waterfront Trail continues east running south of the Arsenal Lands and then through Marie Curtis Park to Etobicoke Creek. A spur trail connects the Waterfront Trail with Lakefront Promenade.

Currently, land-based "open lake views" (or vistas) from the LWC Project Study Area to Lake Ontario are limited as public access to the LWC Project Study Area is restricted.

3.3.3.2 Marine

LWC Regional and Project Study Areas

The LWC Project Study Area is adjacent to one of the largest and busiest of Mississauga's waterfront park complexes, which is comprised of five parks, including Lakeview Park, Lakefront Promenade Park, Douglas Kennedy Park, A.E. Crookes Park and R.K. McMillan Park. Due to its diverse shoreline and direct access to the lake, this area is a prime location for boating. Currently there are four marinas along the waterfront in Mississauga, with two located at Lakefront Promenade and the other two at the mouth of the Credit River. Marine uses within the Lakefront Promenade Marina area include motor boating, boat launching, shoreline and boat-based fishing, canoeing and kayaking. During the summer, the Lakefront Promenade Marina is often densely populated with residents and tourists.

At the eastern limit of the LWC Regional Study Area is Colonel Samuel Smith Park in the City of Toronto. This is a waterfront park that was constructed at the base of the former Lakeshore Psychiatric Hospital and adjacent to the RL Clark Filtration Plant. The waterfront park is a lakefill park that consists of shingle beaches, and naturalized areas, but also provides a large boat basin and fishing opportunities.

The sand beaches at Marie Curtis Park are regularly covered with large volumes of debris and the waters are regularly deemed unsafe for bathing due to high *E. Coli* levels (among the highest levels of all the Toronto beaches), given the proximity of Etobicoke Creek. Out of Toronto's eleven public beaches, Marie Curtis Park is one of three beaches that does not qualify for Blue Flag Beach status. Toronto Parks mechanically rakes the beaches at Marie Curtis Park 2 to 3 times a week. Sand is added to the beaches by City Staff on an as needed basis only and is not a part of routine maintenance operations. Parks staff notes that large rocks underlie the sand at a very shallow depth. A public boat launch is available on the west side of Etobicoke Creek near the lake.

Despite the water quality issues at Marie Curtis Park, the beaches are used as launching and landing points for windsurfers and kite boarders. A website dedicated to the windsurfing community (www.windsurfcanada.com) identifies Marie Curtis Park East (east of Etobicoke Creek) as the preferred location for launching and landing at Marie Curtis Park. Users on the winsurfcanada.com forum identify the south end of Forty Second Street as the ideal parking location providing a short walk to the launch site. Users of this website indicate through the forum section that Marie Curtis Park is recommended for experienced since the area is prone to large waves and numerous hazards.

The kiteboarding community has a similar website (www.localkitespots.com) that identifies Marie Curtis Park as a kiteboarding location. Unlike the Windsurf Canada site, the point location for kiteboarding within Marie Curtis Park is on the western beach near the mouth of Etobicoke Creek. This is likely due to the longer length of the western beach leaving more area for kiteboarders to lay out their lines. Localkitespots.com rates locations based on the degree of difficulty and rates Marie Curtis Park as "advanced". User comments on the site indicate that it is a very difficult beach to launch from due to numerous hazards including rocks and nearshore trees and that other locations in the area such as Cherry Beach or Frenchman's Bay are better options for less experienced riders.

3.3.4 Archaeology

3.3.4.1 Land Based

TRCA archaeologists conducted a Stage 1 Archaeological Assessment in 2012 and 2013 for the LWC Project to provide a general history of land use within the region, and to specifically document the LWC Project Study Area's archaeological and land use history and present condition in order to evaluate the property's archaeological potential. Based on the results of the Stage 1 Study, more detailed in-field Stage 2 assessments were conducted where recommended by the Stage 1 Study.

LWC Regional Area

The Background study was undertaken following the Standards and Guidelines for Consultant Archaeologists set by the Ministry of Tourism, Culture and Sport. The following research information and sources were visited to undertake this assessment:

- the most current list of archaeological sites from the Ministry of Tourism, Culture and Sport's archaeological sites database for the presence of sites in the project area and sites within a 1 km radius of the project area;
- reports of previous archaeological field work within a radius of 50 m around the property;
- topographic maps at 1:10,000 (recent and historical) or the most detailed scale available;
- historic settlement maps and atlases;
- known archaeological management plans or other archaeological potential mapping;
- aerial photography (both recent and historical);
- title deeds and other land registry documents;
- historical land use and ownership records including assessment rolls, census records and commercial directories;
- organizations with oral or written information about the land use of the property and area; and
- secondary historical document sources such as local and regional histories and academic research.

The LWC Regional Study Area has undergone extensive change since the end of the last Ice Age, approximately 12,000 BP. The existing shoreline is located on what is known as the Iroquois Plain physiographic region (Chapman and Putnam 1984), a lake-submerged landscape of the former Glacial Lake Iroquois. The shoreline of Lake Iroquois was situated approximately 3.8 km inland of the existing Lake Ontario shoreline. The terrain would have been similar to the tundra currently found in the eastern sub-arctic. It is thought that the entire population of

Ontario ranged between 100 and 200 people. These PalaeoIndians lived in small family groups and presumably subsisted on caribou and other colder weather animal species.

At the start of the Archaic Period (10,000 to 2,800 BP) lake levels dropped precipitously following the establishment of the St. Lawrence River outlet around 11,400 BP. With water levels 10-20 m lower than current conditions, the shoreline of Lake Ontario would have been much further offshore at that time. Climatic changes occurred during this period resulting in milder winters and long dry summers, and changed the landscape from tundra to spruce forests (Karrow and Warner 1990). This resulted in substantial changes in wildlife in the area, and a corresponding change in the technologies and subsistence strategies incorporated by the Archaic peoples of this time.

Between 10,000 BP and 7,500 years ago, gradual changes in climate resulted in the establishment of our modern climate and vegetation communities, consisting of mixed coniferous-deciduous forest in the region. Water levels in Lake Ontario raised moderately to levels approximating where they are today.

Wood and stone tools underwent technological changes during this time, including the use of native copper that would have been mined from the Lake Superior region. Evidence of native copper from Lake Superior suggests extensive trade routes.

The Initial Woodland Period (2,800 BP to A.D. 700) marked the point when clay pots began to be created, allowing for the storage and transport of food, which helped reduce the hardships faced during winter. It also marked the beginning of the bow and arrow, which revolutionized hunting and warfare. By 2,000 BP, populations became larger, with the establishment of camps and villages with more permanent structures. Trade networks began to extend further to the west in Ohio and to the Atlantic.

The Late Woodland Period (A.D. 700 to 1650) marked the period when maize was introduced to southern Ontario from the south. This provided the basis for horticulture to establish, and a tremendous increase in population, and establishment of permanent villages. However, after centuries of occupation along the north shore of Lake Ontario which involved small-scale warfare and gradual resource depletion (loss of soil nutrients), the Late Woodland groups moved northwards towards Georgian Bay. These groups gradually evolved into the Petun and Huron Nations that were observed by European explorers and missionaries. By A.D. 1650, their populations had dwindled due to disease and through adoption / relocation as a result of continued warfare with the League Iroquois from New York State.

Post-Contact Period (A.D. 1650 to 1805), also known as the Early Historic Period, marks the arrival of small numbers of Europeans interested in exploration, trade and establishment of missions. This marks the gradual adoption of European materials by First Nations peoples. In terms of culture, it is difficult to differentiate between *Haudenosaunee*, *Anishinaabe*, *Métis* and colonial settler campsites given the large-scale interaction and adoption of each other's material goods and subsistence strategies. These permeable boundaries continued until the Crown started to establish segregated reserves in the 18th and 19th centuries in order to grant lands to European settlers. French explorers and fur traders began exploring Lake Ontario and the north shore land, following a centuries-old route well-established up the Humber River (Toronto Carrying Place Trail) and eastern branch of the Rouge River to the Holland River. It is at this time, the Métis culture developed.

The Late Post-Contact Period/Settlement Period (1805-1900), started with the purchase of the southern portion of the Mississauga Tract by the British Crown in 1805. It is at this time Peel County was established, named after Sir Robert Peel, a past Prime Minister of England. From this initial purchase, lands were made available for settlers and the development of villages, towns along the north shore of Lake Ontario in the LWC Regional Study Area.

Given this long history of occupation by First Nation and Metis peoples, and given the importance of the nearshore area of Lake Ontario, and the proximity of the Etobicoke Creek and Credit River, the background report indicated that there is potential for archaeological resources to be found within the LWC Project Study Area. As such, recommendations were made to undertake Stage 2 assessments in the LWC Project Study Area where specific physical works are anticipated as a result of the LWC Project, where past soil disturbances have not already been documented.

The early nineteenth century settler families in this area would have encountered thriving forests filled with plenty of hardwood trees important for building homes and fuelling fires. Families were fortunate if their land had a substantial water source, such as a stream, creek or spring that would attract game animals, provide fish and be a source of drinking water. Clearing the land would have been a tedious, painstaking task but of high importance. The planting, growing and harvesting of crops was vital if the pioneer families were to survive through the harsh winter months. Early accounts of the area indicate that Etobicoke Creek suggested that parts of the creek amounted to little more than a seasonal stream, sometimes dissipating to isolated pools during the summer months. This affected the ability of the water to consistently power mills for flour and lumber. Milling became an unattractive business with the lack of a steady flow and periodic flooding. Only a small handful of water powered mills were able to operate during the nineteenth century.

The Atlas of Peel County provides a wealth of historical information including discussions of population, geography, road, soil, stock, water power, settlement, agriculture and individual villages. Noted is the Niagara Escarpment, dividing the area into upper and lower regions. The study area, being in the lower region, is recorded as being slightly undulating, with a gradual but continual ascent from the lake to the base of the escarpment. The soil, being of loamy clay and sandy loam, was unsuitable for growing wheat, but excelled in crops such as peas, barley, oats, rye, corn and all root vegetables.

The alignment of the mouth of the Etobicoke Creek has changed dramatically over the past 200 years, as has the shoreline of Lake Ontario, based on surveyor's maps and twentieth century aerial photography. Slight errors are not unusual for the nineteenth century maps, but it is reasonable to expect that the course of the creek has changed due to the effects of erosion and storm events during the past 200 years, and engineering works during the last 60 to 100 years. Additionally, an early depiction of Applewood Creek is located in an 1851 surveyed map (Map 6) found in the Township Papers at the Peel Archives of Lots 4, 5 and 6 Concession III SDS. It is illustrated as a long narrow inlet west of the mouth of the "Etobicoke River".

Four Ontario Heritage Plaques were identified in the LWC Regional Study Area: three were located to the west of the LWC Project Study Area; and one immediately east of the LWC Project Study Area:

- Commemorates the loss of life and destruction to property resulting from Hurricane Hazel in1954 at the mouth of Etobicoke Creek. This plaque is located on the east side of Etobicoke Creek in Marie Curtis Park East;
- Commemorates the presence of a nearby Credit Indian Village of 1826;
- Commemorates Government Inn 1798-1861; and
- Commemorates Canada's First Aerodrome. This last plaque is located on the former Lakeview Power Generation Site.

LWC Project Study Area

The Stage 1 Assessment identified three features of note within the LWC Project Study Area: the Arsenal Lands; Long Branch Rifle Range; and Marie Curtis Park.

The Arsenal Lands played an extensive role in the military history of Canada between 1910 and the post-World War Two era. The lands provided extensive factory space to produce munitions and small weapons. The lands were eventually purchased by Canada Post and most recently by TRCA in the early 1990s. Existing structures on the property include the water tower and Small Arms Building. This site will eventually be transformed into public park space bordering the western side of Marie Curtis Park.

The Long Branch Rifle Range was used by the Ontario Rifle Association to train the local militia in 1891. It was used as the training ground by the Department of National Defense during WWII and administration offices for the Royal Canadian Air Force. The Rifle Range closed its doors in 1957. The majority of the Rifle Range is west of the LWC Project Study Area, however, a portion of the earthen-filled wooden baffles and concrete backstop remain south of the Small Arms Building. These lands are owned by the Region of Peel.

Marie Curtis Park was formed after Hurricane Hazel following the destruction of many homes and the relocation of several hundred people. The local government petitioned the Province and Federal government to purchase these properties around the mouth of Etobicoke Creek which formed the basis for Marie Curtis Park East and West. The Park is currently owned by TRCA and maintained by Toronto Parks.

A map was produced indicating areas of higher archaeological potential within the LWC Project Study Area that would require Stage 2 assessments in the event that the project would overlie those areas.

Based on assumptions for construction access routes and proposed channelization works associated with Serson Creek, Stage 2 assessments were conducted in areas of the Arsenal Lands, Region of Peel-owned lands associated with the Long Branch Rifle Range, and lands north of the WWTF near the confluence of the Serson Creek baseflow and stormwater channel. All archaeological surveys indicated that that underlying soils were highly disturbed and that there is low potential for any remaining archaeological resources.

The study does recommend the implementation of standard guidelines pertaining to the construction site operation and management in the event that deeply buried archaeological finds and/or remains are unearthed during the implementation of the LWC Project.

3.3.4.2 Marine

The broad waters of Lake Ontario were and continue to be critical in the development of past and current societies in South Ontario. The water and shorelines of Lake Ontario provide transportation, food, drinking water, materials to build communities, medicine, recreation, and contribute to spirituality, to name but a few elements. Evidence can be found along the shores and in the nearshore areas to provide evidence of human occupation and use of the Lake in more distant times. As the majority of the LWC Project Study Area involves land creation activities within Lake Ontario, it is important to ensure that evidence pointing to that past marine heritage is not lost.

A marine archaeologist was retained in 2012 to undertake background studies to assess the potential for marine archaeological resources within the LWC Regional Study Area, and detailed surveys to explore specific marine archaeological resources at the LWC Project Study Area. A series of reports were generated in 2012 outlining the results of those studies (see Janusas August 2012 and Janusas September 2012).

LWC Regional Area

Background research involved desktop research of existing records and reports of marine and archaeological sites for the entire LWC Regional Study Area. This research came up with extensive information about the recent marine heritage of the Port Credit area, which was a major hub for the past stone-hooking industry of the 1800s and early 1900s. Associated with the stone-hooking activities, a surge in ship construction also occurred in the Port Credit area. A substantial deepwater gill net fishing fleet was also based out of Port Credit.

Stone-hooking involved the removal of aggregate and sheets of bedrock from the lakebed to be used in the burgeoning construction business in Toronto in the 1800s. The nearshore area between Port Credit and Etobicoke Creek would have been a prime area for material extraction that had many noticeable consequences, even in the 1850s. Unrestricted lake mining resulted in the loss of lakefront properties do to the removal of materials and corresponding increase in shoreline erosion as increased wave energy hit the shore. The removal of these materials also removed the elements that provided fish habitat along the nearshore areas of the Lake, which would have impacted many fish communities. This is an impact still felt today.

Prior to the 1800s, First Nations and Metis would have used the waters of Lake Ontario and their access to the Hinterland via river mouths, such as the Credit River, for trade and transportation, fishing, trapping and hunting, as well as the collection of plant materials for food, medicine and spiritual needs. Communities were frequently located near the mouths of major rivers on the Lake Ontario shoreline.

In addition, records indicate numerous shipwrecks in the Port Credit area, west of the OPG piers.

LWC Project Study Area

At the LWC Project Study Area, much more detailed surveys were conducted to ensure that there were no marine archaeological concerns. These studies included:

- Side-scan sonar mapping;
- Magnetometer surveys;
- Visual surveys;
- Remote operated vehicle (ROV) surveys of any “hits” using the above technologies; and

- Pit surveys on the beaches and nearshore area.

Background research also identified that in 1968, three steel barges were sunk to extend the eastern pier at the Lakeview Power Generation site. These barges were:

- Bryn Mawr, built in Chicago in 1900 (the middle barge); and
- The John Fritz and The John R. Roebling, both out of West Bay City, Michigan in 1989.

Following the extensive field surveys conducted throughout 2012, many hits were recorded but following detailed video, visual and pit surveys, it was determined that the hits were deemed modern day refuse. No significant marine archaeological resources were found in the LWC Project Study Area.

3.3.5 Cultural Heritage

LWC Regional and Project Study Areas

The waterfront within the LWC Regional and Project Study Areas has a long history, which dates from the time of the First Nations peoples and continued through the French and British regimes with extensive documentation and maps dating from the 18th Century onwards. In the 20th century, large areas of lake were infilled for Lakefront Promenade Park, the Lakeview Generating Station, and the WWTF. The WWTF site was the location of Canada's first aerodrome and flying school.

The LWC Project Study Area has a strong link with Canadian wartime history, including the Boer War, the Great War, and World War II. Within the LWC Project Study Area, a number of properties are recognized for their direct association with this history (Figure 3.28).

The Arsenal Lands, located at 1400 Lakeshore Road East, are identified as a unique cultural heritage landscape within the City of Mississauga's Cultural Heritage Landscape Inventory (Site No. L-IND-3), based on direct association with Canadian wartime history. Although the Arsenal Lands are not designated under the *Ontario Heritage Act*, the features within the property are to be considered as potential to be listed.

The Small Arms Building and Water Tower, located at 1352 Lakeshore Road East within the Arsenal Lands, have "direct associations with the federal government, World War II, the corresponding Canadian war industry, and the World War II influx of working women. The Water Tower also has direct associations with World War I rifle training." The Small Arms Building and Water Tower are designated under Section 29 of the *Ontario Heritage Act* (By-law No. 0258-2009) as being of cultural heritage value or interest. Key heritage attributes which

reflect the contextual value of the Small Arms Building and Water Tower include the row of deciduous trees to the west of the Small Arms Building and a woodlot of 5-6 trees located to the southwest of the Small Arms Building.

The Long Branch Indoor Rifle Range, located at 1300A Lakeshore Road East on the WWTF property, has "direct associations with WWII, training for WWII, the Long Branch Rifle Ranges, the Department of National Defense, and City of Toronto Emergency Housing. The Indoor Rifle Range yields, or has the potential to yield, information that contributes to an understanding of national defense, particularly WWII militia training." The Long Branch Indoor Rifle Range is designated under Section 29 of the *Ontario Heritage Act* (By-law No. 0170-2012) for its historical/associative, contextual, and physical value.

The Outdoor Firing Range, located at 1300 Lakeshore Road East within the Arsenal Lands, has "direct associations with training for the Boer War, the Great War and World War II, the Department of National Defense, and City of Toronto Emergency Housing. The Outdoor Firing Range yields, or has the potential to yield, information that contributes to an understanding of national defense, particularly militia training since 1891." Key heritage attributes include the concrete backstops and the wooden baffles. A Notice of Intention to Designate the Outdoor Firing Range under the *Ontario Heritage Act* was issued by the City of Mississauga on December 11, 2013.

Figure 3.28 Cultural Heritage Features within the LWC Project Study Area

3.3.6 Aboriginal Interests

LWC Regional and Project Study Areas

There are no recognized Aboriginal reserves or communities currently located within the LWC Regional or Project Study Areas. First Nations and Métis communities with known or suspected historical occupation of the LWC Regional and Project Study Areas are:

- Alderville First Nation (Williams Treaty First Nation);
- Anishnabek Nation/Union of Ontario Indians, Nipissing First Nation;
- Beausoleil First Nation (Williams Treaty First Nation);
- Chippewas of Georgina Island (Williams Treaty First Nation);
- Chippewas of Mnjikaning/Chippewas of Rama (Williams Treaty First Nation);
- Credit River Métis Council;
- Curve Lake First Nation (Williams Treaty First Nation);
- Fort William First Nation;
- Haudenosaunee Confederacy Council;
- Hiawatha First Nation (Williams Treaty First Nation);
- Huron-Wendat First Nation;
- Kawartha Nishnawabe;
- Métis Nation of Ontario;
- Métis National Council;
- Mississaugas of the New Credit First Nation;
- Mississaugas of the Scugog Island (Williams Treaty First Nation);
- Mohawks of the Bay of Quinte;
- Moose Deer Point First Nation;
- Nishnawabe Aski Nation;
- Peel Aboriginal Network; and
- Six Nations of the Grand River.

Although the lands in the LWC Project and Regional Study Areas are not currently used by First Nations or Métis communities for traditional purposes or otherwise, the area is included as part of a larger land claim (Toronto Purchase) by the Mississaugas of the New Credit First Nation which was negotiated to resolution in 2010. It is also noteworthy that the Mississaugas of the New Credit were never approached to sign the 1923 Williams Treaty covering areas in Toronto east to the Bay of Quinte because they had relocated in 1847 to lands adjacent to the Six Nations Reserve southeast of Brantford.

In discussions with the Mississaugas of the New Credit First Nation, CVC and Region of Peel have been advised that the Mississaugas were contemplating the submission of a Claim to the Government of Canada for the loss of riparian rights one mile on either side of the Credit River, and for a one mile area along the Lake Ontario shoreline in the City of Mississauga. The Credit River claim falls within the LWC Regional Study Area, and the Lake Ontario shoreline claim falls within the LWC Project Study Area.

Currently, there are no known culturally significant riparian uses within the LWC Project Study Area. However, in our discussions with the Mississaugas of the New Credit First Nation, they have expressed a strong spiritual attachment to the water and a desire for increased access to the Lake and streams in the area. The Mississaugas of the New Credit First Nation have also expressed an interest in the potential for the collection of medicine and ceremonial activities within the LWC Project Study Area and for some form of commemoration of their use of the area, and where they are now, following implementation of the works. The Mississaugas of the New Credit First Nation have also offered to assist us in the supply of native vegetation from their local nursery in the implementation of the LWC Project. Please see Section 10.7 for a description of engagement activities with Aboriginal communities and a list of the communities contacted.

4.0 DESCRIPTION, EVALUATION AND RATIONALE FOR 'ALTERNATIVES TO' THE UNDERTAKING

4.1 DESCRIPTION OF 'ALTERNATIVES TO' THE UNDERTAKING

The LWC Project will transform the stretch of shoreline between Marie Curtis Park and OPG's Lakeview site from an industrialized edge to a public and ecological asset, which is a longstanding objective of a number of initiatives including Inspiration Lakeview, LOISS and the City of Mississauga Waterfront Parks Strategy. Similarly, Mississauga's current Strategic Plan identifies the waterfront as an area with great potential for creative development and redevelopment. Waterfront redevelopment is expected to enhance cultural and economic richness and create recreational amenities and world-class attractions to improve quality of life for residents and the experience for visitors.

As noted in Chapter 2 (specifically Section 2.1), the identification of the area of the Mississauga waterfront between Marie Curtis Park and OPG's Lakeview site as the LWC Project is the result of several planning studies. All of these studies have identified the need for waterfront access in front of the WWTF and OPG lands and the need for enhanced recreation opportunities. Inspiration Lakeview (see Section 2.1.1.1), a community driven initiative, specifically identified the LWC Project as a key component for implementation. Furthermore, several studies by CVC and others have documented the degraded nature of the ecosystem and the desire to improve habitat. However, the WWTF extends to the shoreline and, because it is critical public infrastructure, access along the shoreline in front of the WWTF is strictly prohibited.

The Ontario *EA Act* (Section 6.1(2)) requires the identification and evaluation of 'Alternatives To' the undertaking, including the consideration of the 'Do Nothing' alternative. 'Alternatives To' the undertaking are defined as different ways to solve the identified problem or address the identified opportunity. The LWC Project is an opportunity to create ecological habitat and public linkages along a stretch of inaccessible and ecologically degraded waterfront in the City of Mississauga. Given the information above, the 'Alternatives To' must address the question of how to create ecological habitat and public linkages.

The 'Alternatives To' the LWC Project are defined as:

- *'Do Nothing'*. This alternative will retain the existing conditions along the waterfront and nearshore but will include already approved or planned improvements to the Arsenal Lands and Marie Curtis Park.
- *Create new natural waterfront park on existing land*. This alternative will examine whether or not there is the potential to create habitat and public linkages on the existing land base.

- *Create new natural waterfront park on new created land*. This alternative involves creating new natural parkland along the waterfront to establish diverse aquatic and terrestrial habitats and to improve public access and recreational opportunities. This would be accomplished through the reuse of clean fill, generated by municipal and private capital projects.

4.2 EVALUATION OF 'ALTERNATIVES TO' THE UNDERTAKING

Each of the "Alternatives To" and their ability to achieve the LWC Project goal and objectives as outlined in Section 1.2.

4.2.1 'Do Nothing'

The 'Do Nothing' alternative would see no changes to the existing waterfront area in the LWC Project Study Area. With respect to each of the objectives:

1. **Naturalization** – the existing terrestrial and aquatic habitat is degraded in quality and does not support continuous linkages along the waterfront. The 'Do Nothing' alternative would not change this and therefore does not meet this LWC Project objective.
2. **Access** – the existing LWC Project Study Area does not allow for continuous public access to the waterfront for recreational, educational or cultural heritage opportunities from the western limits of Marie Curtis Park and does not connect the Waterfront Trail to the shore. The 'Do Nothing' alternative would not change this and therefore does not meet this LWC Project objective.
3. **Compatibility** – because the 'Do Nothing' alternative leaves the existing infrastructure in its current state, this alternative meets the LWC Project Compatibility objective.
4. **Coordination** – the 'Do Nothing' alternative does not move any local planning or development initiatives closer to meeting their goals and objectives. As such, this alternative does not meet the Coordination objective of the LWC Project.
5. **Fiscal Viability** – while the 'Do Nothing' alternative would not require the expenditure of any monies, it would also not create an innovative use of a currently wasted resource (i.e., the clean fill generated by public infrastructure projects). This alternative does not meet this objective.

While the 'Do Nothing' alternative meets the Compatibility objective of the LWC Project, it does not meet the other four objectives. In addition, this alternative would not achieve the goal of the LWC Project.

4.2.2 Create New Waterfront Park on Existing Land

This alternative evaluates the ability of the goal and objectives of the LWC Project to be met through creation of a new natural waterfront park on the existing land. With respect to each of the objectives:

1. **Naturalization** – the existing terrestrial and aquatic habitat along the waterfront in the LWC Project Study Area is degraded, of poor quality and does not allow for linkages along the waterfront. The creation of a new waterfront park on the existing land alternative would not change this and, therefore, does not meet this LWC Project objective.
2. **Access** – the existing LWC Project Study Area does not allow for public access to the waterfront for recreational, educational or cultural heritage opportunities and it does not connect the Waterfront Trail to the shore. This alternative would not change this situation and therefore does not meet the LWC Project Access objective.
3. **Compatibility** – the Region of Peel cannot move the WWTF operations back from the shoreline; as such, this alternative leaves the existing infrastructure in its current state and the creation of a new waterfront park on the existing land meets this LWC Project objective.
4. **Coordination** – the creation of a new waterfront park on the existing land will not allow for public waterfront access and does not improve the existing terrestrial and aquatic habitat; as such, this alternative will not move any local planning or development initiatives closer to meeting their goals and objectives. As such, this alternative does not meet this objective of the LWC Project.
5. **Fiscal Viability** – creation of a new waterfront park on the existing land would presumably require the expenditure of public monies; however, it would not create an innovative use of a currently wasted resource (i.e., the clean fill generated by public infrastructure projects). As such, this alternative does not meet this objective.

While this alternative does meet the Compatibility objective of the LWC Project, it does not meet any of the other four objectives. In addition, because new ecological habitat will not be created and public linkages to the waterfront will not be created, this alternative also does not meet the goal of the LWC Project.

4.2.3 Create New Waterfront Park on New Land

This alternative evaluates the potential to establish a new natural waterfront park on land that is created using clean fill. With respect to each of the objectives of the LWC Project:

1. **Naturalization** – the addition of land on the lakeside of the WWTF will allow for the creation of both terrestrial and aquatic habitat that will be better quality than existing habitat and will allow for linkages along the waterfront. This alternative does meet this LWC Project objective.
2. **Access** – the addition of land that is lakeside of the WWTF will alleviate security concerns associated with the WWTF, allow for public access to the waterfront for recreational, educational or cultural heritage opportunities and will allow for the connection of the Waterfront Trail to the shore. As such, this alternative does meet the LWC Project Access objective.
3. **Compatibility –** this alternative will require further design to ensure it is compatible with existing infrastructure; however, ensuring compatibility is not likely to be insurmountable. As such, this alternative will be designed to ensure that this LWC Project objective is met.
4. **Coordination –** this alternative will not only create ecological habitat, it will also create new opportunities for public access to the waterfront as well as recreational opportunities that will move local planning and development initiatives closer to meeting their goals and objectives. As such, this alternative does meet this objective of the LWC Project.
5. **Fiscal Viability –** while this alternative will require the expenditure of public monies, it would also create an innovative use of a currently wasted resource (i.e., the clean fill generated by public infrastructure projects). Use of this currently wasted resource is expected to help offset the required funding. This alternative meets this LWC Project objective.

This alternative will or has the potential to meet the goal as well as all five LWC Project objectives.

4.2.4 Summary

As there is no potential to create habitat and public linkages on the existing land, new land must be created to establish the new natural waterfront park. For all of the LWC Project objectives, the creation of ecological habitat and public linkages through the creation of land is the preferred way to solve the identified problem/opportunity when compared to doing nothing or using the existing land base. Therefore, alternatives involving land creation have the greatest potential to meet the LWC Project objectives and will be carried forward to the development of ‘Alternative Methods’.

The ‘Do Nothing’ alternative will be assessed against the preferred alternative as part of the detailed assessment in Chapter 7.

5.0 DESCRIPTION, EVALUATION AND RATIONALE FOR 'ALTERNATIVE METHODS' OF CARRYING OUT THE UNDERTAKING

'Alternative Methods' are different ways of doing the same activity. In the context of the LWC Project, 'Alternative Methods' are similar ways of designing a new natural waterfront park on created land with ecological habitat and public linkages within the LWC Project Study Area.

For the purpose of the EA, different 'Alternative Methods' were identified by modelling different fill volumes and alternative shoreline treatments in relation to the coastal processes that will ultimately dictate their configuration. The initial identification of 'Alternative Methods' considered the amount of fill required to establish a footprint upon which other LWC Project objectives could be achieved. Different combinations of hard and soft shorelines (i.e. revetment vs. beach) and the incorporation of different fill volumes produced a series of alternative footprints upon which the various LWC Project objectives could be achieved. LWC Project objectives were addressed as subsequent layers applied to the alternative footprints. The identification and evaluation of 'Alternative Methods' was carried out in a four-step process, depicted in Figure 5.1.

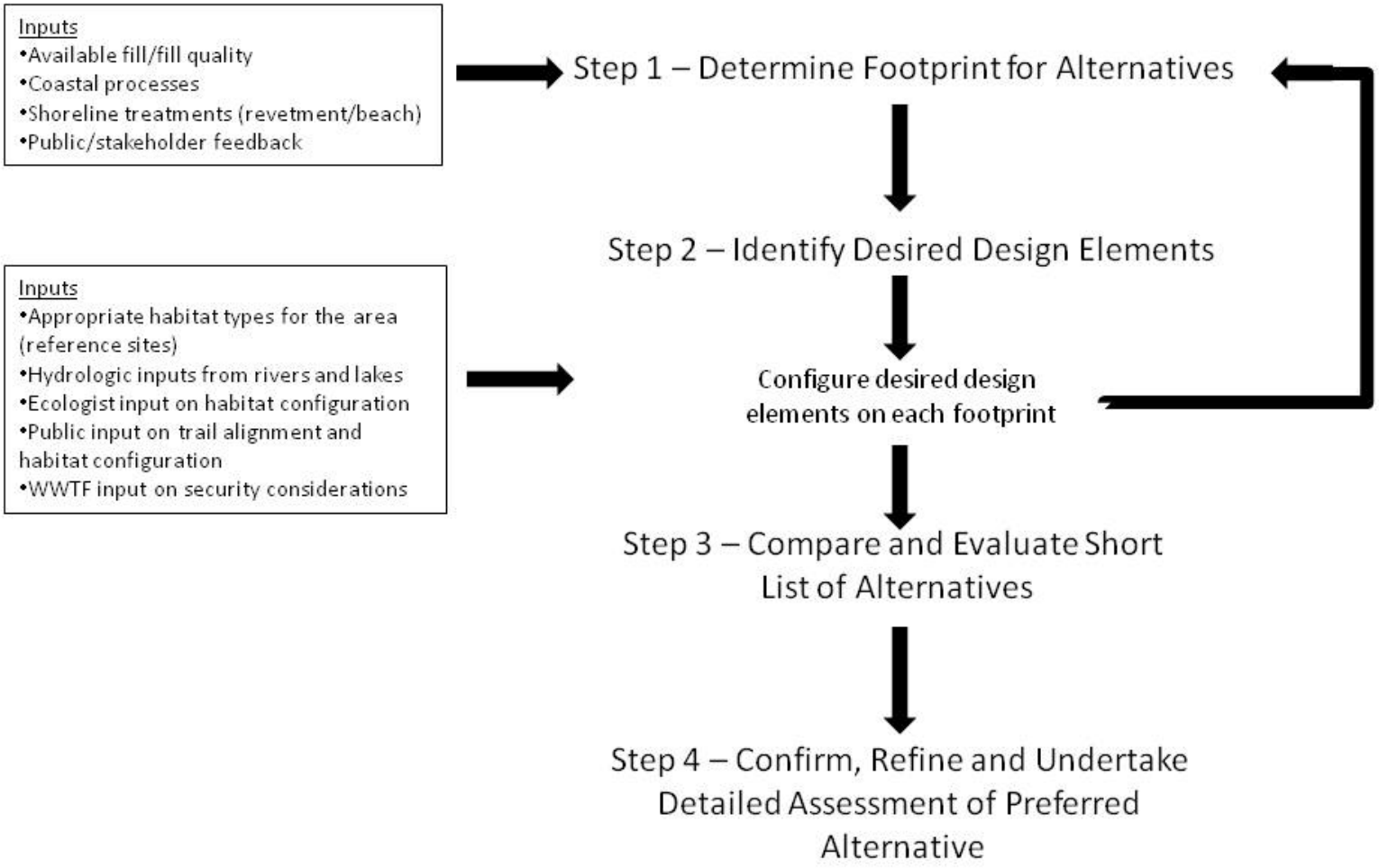
5.1 STEP 1: DETERMINE FOOTPRINT FOR ALTERNATIVES

The first step in defining the Alternative LWC Project Configurations was to develop a range of footprints[12] up to a maximum spatial extent. This range of footprints was determined through consideration of coastal processes, effects on water quality and the economical use of fill. The LWC Project footprint can be affected by and/or can affect coastal processes to the detriment of the broader LWC Regional Study Area or to the detriment of the LWC Project footprint itself. Footprints needed to be designed in a way that does not negatively affect coastal processes and must be able to withstand the same processes. Alternative LWC Project Configurations include both the footprint of the land creation area and the ecological and public access features within the footprint.

The development of Alternative LWC Project Configurations was driven by the LWC Project objectives related to the creation of habitat and public access and informed by the available volumes of fill and input from the public and technical experts. It is anticipated that between 1.5 and 2.0 million cubic metres of clean fill will be available through infrastructure works planned by the Region of Peel over the next ten years. The shape and location of the footprint was also influenced by the location of existing intake and outfall infrastructure, the need to provide access to this infrastructure, and the avoidance of any significant marine archaeological resources.

[12] "Footprint" refers to the size and shape of the fill area.

Figure 5.1 Framework to Identify and Evaluate 'Alternative Methods'



The methodology for determining the footprint for the 'Alternative Methods' involved:

1. Determining an appropriate range of fill volumes;
2. Determining the effect of coastal processes on land creation;
3. Determining appropriate range of shoreline treatments to establish a stable footprint;
4. Generating an initial set of alternative footprints; and
5. Refining alternative footprints based on public and stakeholder input.

5.1.1 Determine an Appropriate Range of Fill Volumes

Currently, the Region of Peel has long-term plans for infrastructure works throughout the Region of Peel that are anticipated to generate significant volumes of clean fill. This clean fill is typically treated as waste and hauled long-distances for disposal. The LWC Project is an opportunity to use this generated material as a resource to meet the naturalization and public access objectives and use the offset costs from the reduced haulage to help fund the planning and implementation of the LWC Project. The Region of Peel anticipates that between 1.5 and 2.0 million cubic metres of clean fill would be generated as a result of these infrastructure projects. For the initial generation of Alternative LWC Project Configurations (i.e. 'Alternative Methods'), an upset limit of 2.0 million cubic metres of clean fill was used to represent the maximum potential extent of the LWC Project footprint. Based on the projected availability of clean fill for the LWC Project, the EA Technical Team looked at the other factors that would determine a range of potential sizes and shapes for Alternative LWC Project Configurations.

5.1.2 Determine the Effect of Coastal Processes on Land Creation

An initial assessment of wave climate within the LWC Project Study Area was carried out prior to the development of the Alternative LWC Project Configurations. The purpose of the initial wave assessment was to establish net wave energy and design wave heights in the LWC Project Study Area. The analysis was completed for a node located within the LWC Project Study Area in water depth of 5 m below chart datum. The net wave energy is used for the initial assessment of beach alignment for shoreline treatments with beaches. Figure 3.12 shows the dominant wave energy distribution in the general area of the LWC Project. The energy distribution is very strongly dominated by easterly waves. There is also a weak, but well defined, secondary direction energy component directly from the south. This analysis indicated that footprints must be aligned perpendicular to the dominant wave energy (from the east) and beaches would consist of cobble (up to 200 mm diameter) to remain stable at this node location (5 m depth).

5.1.3 Determine Appropriate Range of Shoreline Treatments to Establish a Stable Footprint

The Alternative LWC Project Configurations were developed using reasonable assumptions and simplifications regarding the elevation of the site and overall site grading. The final site grading plans may modify the total fill volumes. The average fill grade over the site is assumed to be 79.0 metres above sea level (masl). This elevation is used since it is anticipated to be the minimum wave uprush elevation along the exposed part of the shoreline of the fill site.

Normal land creation procedure includes the construction of a perimeter berm using concrete rubble or core stone material. The crest elevation of the berm is 78.0 masl. This is lower than the average fill level. It is anticipated that the crest of the actual protection structure will be built up on top of the berm. The berm is assumed to be 10 m wide at the crest and side slopes are 2h:1v. The 10 m width allows for two way traffic on top of the berm during construction.

The perimeter berm can be constructed entirely around the site or in stages based on anticipated annual fill volumes. The shape of the landform should try to minimize the perimeter length and volume of the berm while maximizing the internal fill volume. Theoretically, this suggests circular or square containment cell shapes would be the most efficient to achieve this. This ideal approach must be tempered due to potential problems that can be caused by the introduction of sharp changes in shoreline alignment associated with these shapes. Potential problems can include sudden deflection of currents, collection of debris or sediment and/or creation of “dead water” areas.

Three types of shoreline treatments were considered for the Alternative LWC Project Configurations. The potential shoreline stabilization treatments include armour stone revetment concepts, headland beach concepts and island beach concepts.

5.1.4 Generate Alternative Footprints

Concepts with armour stone revetment protection were developed by creating landforms that have a minimal footprint and gently curving shores. The minimal footprint was achieved by extending the landforms into the deeper water fronting the south part of the LWC Project.

The headland beach concepts were prepared with cobble beaches facing the direction of net wave energy from the east. The beaches are between 100 m and 200 m long. Longer beach cells are not recommended at the conceptual design level. Most of the beach cells are less than 150 m long. The beaches were assumed to be constructed of cobble size material, generally in the order of 100 mm to 150 mm. Widths of the beaches were approximated and assumed using a typical

slope of 4h:1v. The slope of the beaches can vary and will be analyzed in more detail during later stages of planning. Beaches, rather than headlands, are located over the existing outfall pipes. All of the beaches show the same alignment due to the significant domination of the east quadrant wave energy. Locating beaches perpendicular to the secondary south quadrant wave vector would require substantial sheltering of the beach from the east waves. The remainder of the shoreline outside of the beach sector is protected with an armour stone revetment.

The island beach concepts follow the same design approach as the headland beaches except that the headlands are replaced with offshore islands. The islands are positioned with their long axis parallel to the beach alignment. This allows for the creation of a semi-sheltered water area behind the island. The beach alignment is expected to curve outward possibly forming a tombolo[13] that may connect to the island during low water levels.

The three initial footprint concepts (revetment, headland beach and island beach) are depicted in Figure 5.2. These alternative concepts could be expanded or contracted according to the amount of fill available for the project resulting in varying extents into Lake Ontario.

5.1.5 Refine Alternative Footprint Concepts

The three alternative footprint concepts depicted in Figure 5.2 were presented in a workshop with the CLC on October 9, 2012 and the LWC EA Technical Team on October 19, 2012 to solicit feedback on the designs and determine if other designs should be considered. Based on feedback from the CLC workshop and further input from the Technical Team, two additional island beach alternative footprints were generated that provided different functional characteristics to the original alternative footprint shapes (Figure 5.3). The first new island beach alternative footprint (Island Beach B) connects the northern most island to the mainland, establishing a sheltered embayment feature. The second new island beach alternative footprint (Island Beach C) allows for the creation of a longer, linear cobble beach extending to Etobicoke Creek that avoids a “hook” feature at the north end as identified on the original island beach footprint (Figure 5.3). Consultation with the CLC and the LWC EA Technical Team resulted in five alternative footprints that were carried forward for evaluation (Figure 5.3).

[13] Tombolo is a narrow spit of beach material that connects the main beach with the headland.

Figure 5.2 Initial Alternative LWC Project Configurations

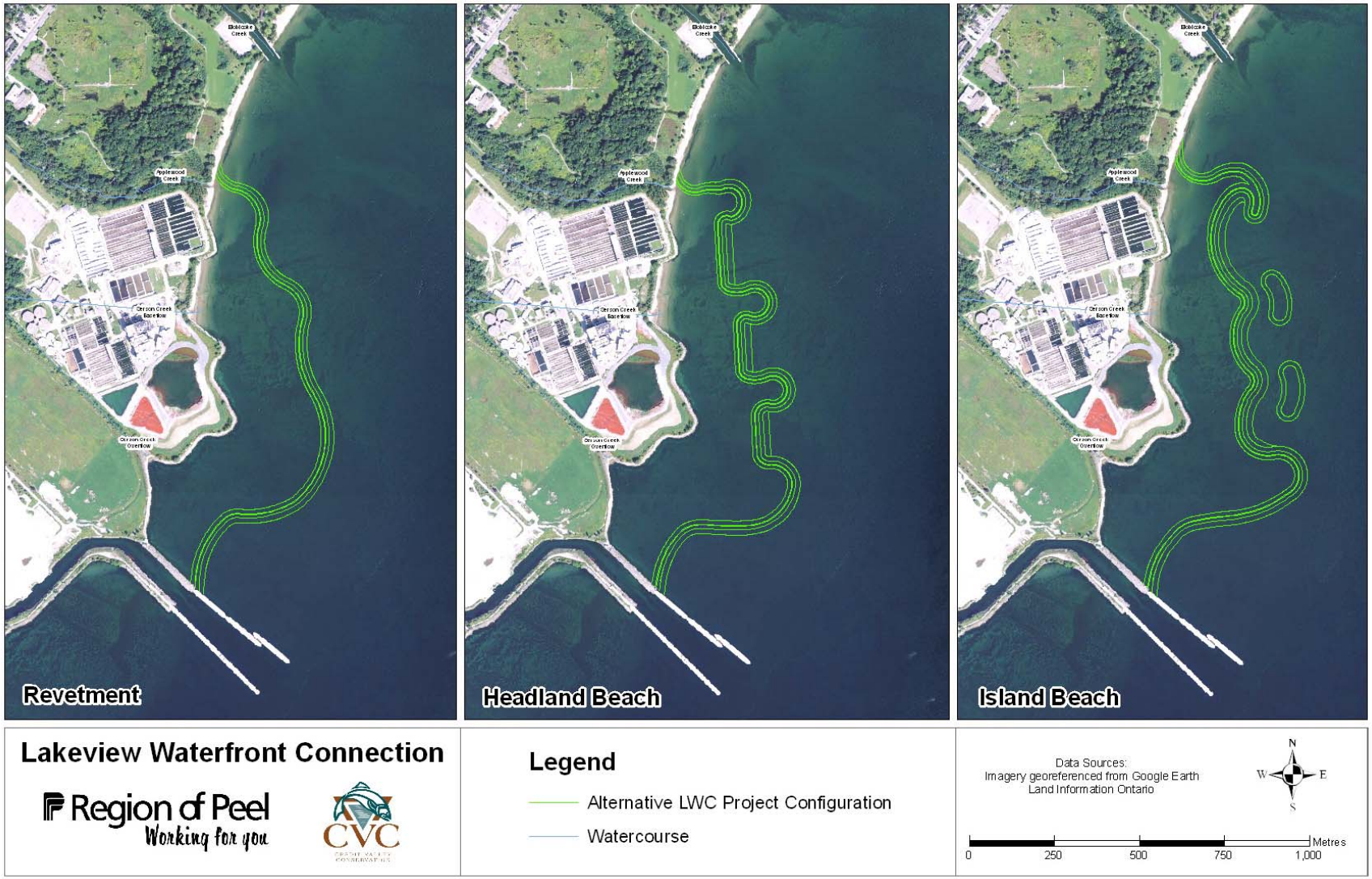
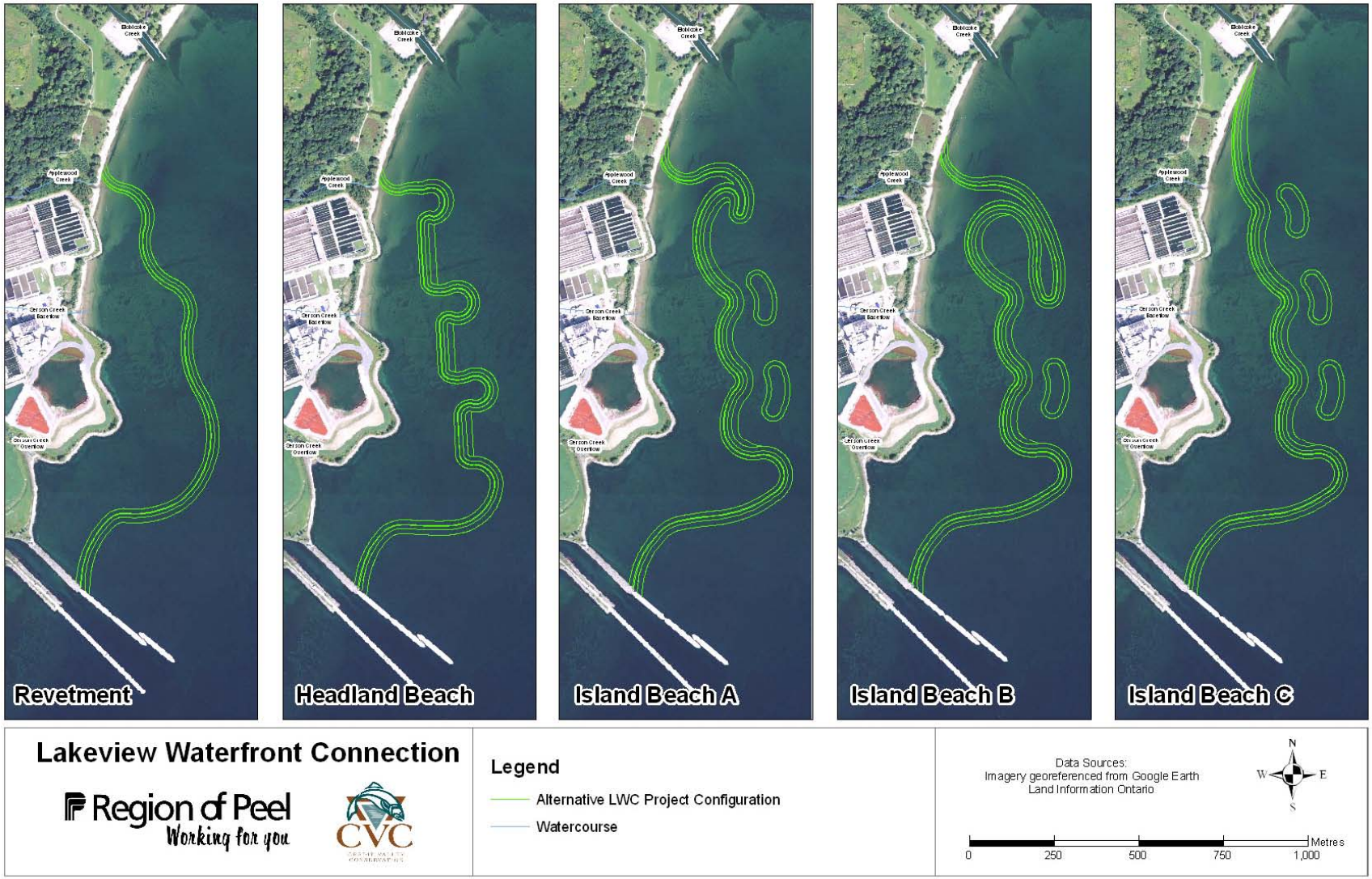


Figure 5.3 Final Alternative LWC Project Configurations



5.2 STEP 2: IDENTIFY DESIRED DESIGN ELEMENTS

The LWC Project goal is "to create a new natural park that will establish ecological habitat and public linkages on the eastern Mississauga waterfront". To achieve the LWC Project goal, a series of ecological and recreational design elements that address the LWC Project objectives were layered onto the alternative footprints.

Consultation with the public, the CLC, the EA Technical Team and the TAC identified a number of design elements that would be included on each alternative footprint to meet the LWC Project goal and objectives. Key design elements that were identified for the alternatives included:

- A multi-use recreational trail to provide access to and along the waterfront;
- Opportunities for passive recreation; and
- Naturalized ecosystem components that were appropriate for the north shore of Lake Ontario based on historical conditions in the area.

With these broad categories of desired design elements identified, it was necessary to solicit input from the LWC EA Technical Team to identify the individual building blocks that would make up each design element (see Sections 5.2.1 and 5.2.2). Once the individual building blocks were identified, the LWC EA Technical Team, in consultation with the public and stakeholders, arranged the building blocks onto each alternative footprint.

The methodology for the identification of desired design elements and their placement on the alternative footprints involved:

1. Consultation with the public and stakeholders to identify desired design elements;
2. Ensuring general compatibility between desired design elements and the Inspiration Lakeview Vision;
3. Determining the ecological building blocks that are appropriate for meeting the naturalization objective (Section 5.2.1);
4. Determining the public linkage building blocks that are appropriate for meeting the access objective (Section 5.2.1); and
5. Layering the individual building blocks onto the alternative footprints utilizing input from the public and stakeholders.

5.2.1 Appropriate Ecological Communities for the LWC Project Study Area

Due to the historical mix of industrial and residential land uses within the LWC Project Study Area, opportunities for sizeable and functional habitat patches were limited or unfeasible. The LWC Project provides an opportunity to create a considerable and functional naturalized area,

which will provide connectivity both regionally and locally for migrating terrestrial and aquatic species.

As part of the preliminary identification of habitat components for the Alternative LWC Project Configurations, specific habitat types were identified that would provide a foundation for local and regional ecological processes. These habitat types are discussed in detail below.

5.2.1.1 Coastal Terrestrial Habitat

The spatial arrangement of coastal terrestrial vegetation patterns along the north shore of Lake Ontario can vary with slope and exposure to elements in the nearshore area. Herbaceous vegetation often dominates closest to the water followed by hardy shrubs and successional tree species. Generally, the forest area could consist of oak savannah and Carolinian type trees including cottonwood. The site would be typified by vegetation species which would maximize the quality and quantity of stopover habitat to benefit migratory species in the fall fruiting period. It also offers habitat that would maximize invertebrate diversity in the spring that would also benefit both migratory and resident wildlife, and encourage the production of terrestrial and aquatic invertebrates given the proximity to water in the streams, wetlands and shoreline areas.

5.2.1.2 Stream and Wetland Habitat

Within the proposed land creation area two creeks are present: Applewood Creek and Serson Creek (see Section 3.1.1.2). Applewood Creek is currently connected ecologically with Lake Ontario up to Lakeshore Road. Flows in Serson Creek are currently bisected north of the WWTF, with base flows running through a culvert under the WWTF and discharging on a remnant sandy beach immediately south of the plant. A large, straight stormwater channel has also been cut between the WWTF and the OPG lands, diverting overbank flood flows in Serson Creek directly to the lake. Given this configuration, fish are unable to migrate from the lake to Serson Creek. Opportunities to provide connections between the lake and Serson Creek were explored as part of the LWC Project to maximize benefits of the proposed constructed wetlands. In addition, the Inspiration Lakeview visioning activities contemplated the possibility of rerouting Serson Creek through the middle of the OPG lands. Wetland patch size and orientation were considered in the development of the Serson Creek wetland to accommodate that potential future change.

As in many similar coastal marshes on the north shore of Lake Ontario, the connectivity of these streams would be highly reliant on balancing watershed and lake driven inputs. The optimal wetland habitat size should replicate historical conditions and other similar watersheds found along the north shore of Lake Ontario while considering current watershed conditions. Ensuring

stream connectivity and structure within the wetlands will also maximize the use of water, and create additional habitat diversity.

5.2.1.3 Shoreline & Nearshore Habitat

The land creation area should be designed to benefit the coastal habitats within the LWC Project Study Area, allowing for transitions from the water to the beach and terrestrial habitats. Structurally diverse shoreline treatments should be favoured. Given the depths of 5-6 m on the lakeward edge of the landform, shoreline treatments should be structured to augment fish habitat.

In general, the more complex and diverse the Alternative LWC Project Configuration, the more effective that shoreline will function for fish and wildlife uses. Further, shorelines that have shallower slopes transitioning from the terrestrial lands down to the water's edge will be deemed as providing better functioning habitat for most species of fish and wildlife.

The range of shoreline types considered included: revetments, headlands and beaches, and different configurations of islands and beaches.

Revetments consist of large interlocking quarried blocks forming a steep wall from the lake bed to the top of the landform, making the movement between the lake and the shore difficult for most wildlife. Shorelines using armourstone tend to be relatively uniform and offer limited opportunity for fish communities.

Headland beaches consist of a series of spaced constructed armourstone headlands that are connected to the landform but protrude further out into the lake. Linear beaches consisting of smaller, mobile materials such as sand, gravel and cobbles are located along the shoreline between these hardened headlands which prevent the beaches from washing away. These beach shorelines provide more diverse habitat structure, and offer opportunities for movement of resources and wildlife between the land and water than revetments. In the case of the LWC Project, given the depth of water and wave conditions, beach materials will largely consist of cobbles.

Island beaches consist of a series of constructed low-lying armourstone islands that are not connected to the landform above water under average water levels. The shorelines then consist of a long, uninterrupted beach front consisting of smaller mobile materials such as gravel and cobble. These shorelines offer the most diverse structural habitat, offering the most shoreline/water interface area, and provides unique "sheltered" habitat on the shoreside of the islands. The shoreline/water interface area is generally more productive habitat. As with the headland beaches, the island beach materials will largely consist of cobbles in the deeper watered

areas, but where proposed beaches approach the existing shorelines, the beach will grade to smaller materials due to smaller waves.

5.2.2 Refinement of Habitat Components for the LWC Project Study Area

The preliminary natural heritage components for the LWC Project Study Area were refined based on a number of principles, in order to determine sizes and features for the LWC Project Study Area.

Aquatic habitat principles considered:

- Historical natural heritage conditions;
- Current watershed conditions;
- Wetland functions;
- Maximize habitat diversity within natural limitations;
- Relevant reference sites along the northwestern Lake Ontario shoreline; and
- Consideration of all aquatic habitat enhancements to achieve "No Net Less" of fish habitat arising from disruption or removal of aquatic habitat from land creation.

Terrestrial habitat principles considered:

- Creation of habitat areas that were large enough to provide wildlife refuges and functions;
- Orientation and zonation of natural habitat areas in relation to distance from the Lake;
- Topographical variations (macro and micro); and
- Connections to adjacent natural areas.

These principles are discussed in greater detail in the following sections.

5.2.2.1 Historical Natural Heritage Conditions

Historical conditions of the LWC Project Study Area provide context for the natural heritage conditions which would have naturally existed in the absence of urbanization, and provides appropriate baseline knowledge regarding the appropriate ecological features for the area. While wetlands were once abundant across the lower Great Lakes basin, wetlands have experienced a significant decline since the late 1700's, with the loss of approximately 57% of historical wetlands west of the Bay of Quinte (Whillans 1982) and primarily within the GTA.

Within and immediately adjacent to the LWC Project Study Area, historical aerial imagery and mapping (see Chapter 3) indicates the presence of a well vegetated, 1.60 ha, low-lying coastal marsh at the mouths of Serson Creek, Applewood Creek, and Etobicoke Creek, established behind a barrier beach. Also present were 1.37 ha and 0.4 ha of estuarine habitat, associated with Applewood Creek and Etobicoke Creek, respectively. As presented in Section 3.2.1.4, by the mid-1960s, the wetland/coastal marsh connecting the three creeks had undergone significant change due to human influences and were no longer present. Even the historical aerial photos from 1946 and 1954 (see Figures 3.18 and 3.19 in Section 3.2.1.4) represent degraded coastal wetland conditions and were likely much smaller than the original wetland areas observed at the mouth of Etobicoke Creek in the 1700s as depicted in sketches provided by European colonists to the area (TRCA 2002).

There is an opportunity with the LWC Project to create "river-sourced" wetland habitat by incorporating flows from Applewood Creek and Serson Creek. Depending on the final elevation of the proposed wetlands, a portion will be influenced by lake water which will be vital to provide a functional habitat connection for the marshland ecotone.

Key Principle:

- Coastal wetland systems should be influenced by both river and lake inputs.
- The historical air photo of the LWC Project Study Area depicts a total of approximately 3.5 ha of coastal wetland in 1940s. This represents a reasonable lower limit for wetland habitat to be considered in refining Alternative LWC Project Configurations.

5.2.2.2 Wetland Function

Although water levels in Lake Ontario have been semi-regulated as a result of the St. Lawrence Seaway Project (1954), seasonal and wave related water level fluctuations can impact thermal regimes, and thus the extent and composition of coastal wetland vegetation (Keough *et al*. 1999). While these fluctuations can provide ecological benefits, they can also introduce negative impacts to the system, such as sudden coldwater upwellings, and the proliferation of invasive species (e.g., the common carp). As such, in order to buffer the negative impacts from these fluctuations, the coastal wetlands proposed for the LWC Project will be designed appropriately.

Wetland function, in the case of constructed and managed wetlands, refers to the regulation of water levels in order to promote, adjust, or maintain a diversity of wetland flora and fauna. For the LWC Project, there is an opportunity to use water control structures for the coastal wetlands in order to provide variable environmental conditions, such as water level and temperature fluctuations, and the transfer of sediment. These conditions can be achieved by using coastal

wetland designs based on two geomorphic types of wetlands which are found along the north shore of Lake Ontario, as described by Keough *et al.* (1999): protected wetlands; and drowned-river mouth and flooded-delta wetlands.

- **Drowned-river mouth and flooded-delta wetlands** have direct surface-water connections that occupy flooded river valleys or cap drowned deltas that are driven by both lake and riverine water inputs. These wetlands often have a narrowed lake opening and depending on the rate of inundation, may have river banks that form a natural levee system from fluvial deposits. These levees provide the conditions for overbank pocket wetlands which often become connected to streams by bank breaching.
- **Protected wetlands** are isolated from most of the direct hydraulic processes generated by the lake. Historically, protected wetlands may have existed within the LWC Project Study Area during years of low lake levels and when littoral sediments formed a contiguous barrier beach.

Key Principles:

- Wetland areas should depict similar characteristics to other coastal wetlands found on the north shore of Lake Ontario. Two applicable wetland forms for consideration include: drowned-river mouths with natural appearing levees and pocket wetlands; and coastal wetlands that are periodically protected from direct lake effects through the establishment of barrier beaches.

5.2.2.3 Relevant Reference Sites Along the Northwestern Lake Ontario Shoreline

Using reference sites which possess similar conditions to the historical conditions of the LWC Project Study Area provides insight into habitat features for the LWC Project Study Area.

Rattray Marsh and Turtle Creek Marsh are located along the western Lake Ontario shoreline within the vicinity of Project Study Area. Rattray and Turtle Creek Marshes are a drowned river-mouth (bay-bar) coastal wetlands, approximately 13.9 & 2.4 ha in size respectively. Rattray Marsh is located behind a barrier beach system. The Rattray and Turtle Creek wetlands are classified as 78/53% marsh and 22/47% swamp respectively, while the surrounding areas composed of forest, subdivision and parkland.

Gold Point Marsh, located along the City of Oshawa shoreline, is composed of similar wetland habitat as would have historically been found in the LWC Project Study Area. Gold Point Marsh is a drowned river-mouth coastal wetland, approximately 4 ha in size, located behind a barrier beach system. The wetland is classified as 65% marsh and 35% swamp, while the surrounding area is composed of forest, thicket and meadow (CLOCA 2011).

As the above examples and Applewood Creek possess a similar drainage area and both exhibit urban headwaters, they were deemed appropriate reference sites for the design of the wetland complex at the mouth of Applewood Creek.

Key Principles:

- The watersheds, coastal wetlands and surrounding terrestrial habitats at Rattray Marsh, Turtle Creek Marsh, and Gold Point Marsh possess similar conditions to what would have been found in the Applewood Creek area in the 1940s. The examples depict a wetland habitat size of 3.5 ha to 4.0 ha that would be appropriate for each of the Serson Creek and Applewood Creek coastal wetlands. Features observed at these Marshes were used as a reference site for the LWC Project.

5.2.2.4 Ability of Aquatic Habitat Enhancements To Achieve "No Net Loss" Of Fish Habitat

Land creation activities will create a loss of aquatic habitat which will require compensation under CVC's management goal of no net loss of productive capacity of fish habitat. As such, an important consideration in the development of the natural heritage components of the Alternative LWC Project Configurations is an understanding of the potential loss of productive fish habitat, such that habitat components may be designed to be as self-compensating as possible. CVC Policy encourages all planning and permit applications to achieve an ecological gain. Where it has been demonstrated an ecological gain is not feasible, CVC will promote the principle of no-net-loss of ecological functions and hydrologic functions (CVC 2010).

A preliminary analysis of potential compensation required was undertaken and identified a number of habitat components important in offsetting the loss of productive fish habitat.

Key Principles:

- Alternative LWC Project Configurations should be designed to be as self-compensating as possible with regards to loss of productive fish habitat.
- Coastal wetlands that provide a benefit for fish production and large in-land wetlands that provide warm, highly vegetated areas for fish spawning and rearing should be included as habitat components in addition to the proposed shoreline treatments.
- Cobble beaches are preferable over revetment or other hardened shoreline treatments as they provide foraging and spawning opportunities for nearshore pelagic species.
- Maximizing shoreline or diversity is recommended to maximize habitat gains required to offset losses generated with land creation activities.

5.2.2.5 Create Habitat Areas Large Enough to Provide Wildlife Refuges and Functions

Habitat quality is based on a number of factors, including but not limited to: habitat size and cohesiveness, shape, diversity and ability to provide linkages. In general, larger, un-fragmented habitat patches with connectivity to other adjacent habitats and limited human influence are more diverse, productive and better able to act as a wildlife refuge. In the development of Alternative LWC Project Configurations, general guidelines identified in the Peel – Caledon Significant Woodlands and Significant Wildlife Habitat Study (2009), were used to benchmark minimum habitat size targets for functional forest (4 ha) and meadow (10 ha) habitats in the design of the LWC Project.

Key Principles:

- Create large contiguous blocks of habitat with minimum targets of 4 ha for forest and 10 ha for meadow habitat.
- The following items will make the natural areas more attractive to wildlife:
    - **Shape:** Blocks should be generally round or square to reduce edges and provide more sheltered interior conditions. In general, thicker blocks are better than thinner blocks.
    - **Diversity:** A variety or mosaic of habitats including forest, meadows, successional and wetlands are better to encourage different types of wildlife. Wildlife uses more than one type of habitat.
    - **Linkage:** Connect existing and future habitats to create larger matrices of natural areas.

5.2.2.6 Orientation and Zonation of Natural Habitat Areas in Relation to Distance from the Lake

The Lake Ontario shoreline is a harsh environment. The vast open fetch lengths of the lake allow for the development of strong winds and large waves. Where shorelines drop off rapidly, wave and wind energy can be particularly strong. As a result, features found along shorelines and the coastal terrestrial areas are reflective of these harsh conditions. Beaches in an environment similar to the LWC Project Study Area would be long and linear, consisting of larger cobbles that are regularly moved by the waves. The adjacent terrestrial coastal habitats adjacent to the beach usually consist of low-lying meadow grasses and hardy shrubs that are able to withstand the desiccating influence of strong winds. As you move further inland, conditions become less severe and more woody shrubs and treed vegetation begin to establish. Thus, when seen from above, a natural shoreline would appear to have linear bands running the length of the shoreline of beach, meadow, shrubs and forest. The configuration of these bands can be

influenced by underlying soils and geology, wave climate, the presence of wetlands and changes in topography.

Key Principles:

- Design the natural areas to follow patterns observed at other sites on Lake Ontario.
- Natural coastal areas adjacent to shorelines allow for:
    - Natural beach features (whether sand, gravel or cobble) to offer dynamic processes that provide higher function than static armoured shorelines;
    - Transitional access points for wildlife that are able to cross from aquatic to terrestrial habitats and allow for other food web interactions; and
    - Establishment of appropriate habitat zones in relation to proximity to the shorelines: generally speaking, as you move further from the beach areas, vegetation transitions from hardy meadow species to woody shrubs to coastal forest species.

5.2.2.7 Incorporate Topographical Variations

Natural areas are not flat. Small changes to elevation on large and small scales create a diversity of habitat needed for wildlife. Topography designed for trails through natural areas can also help deter off-trail disturbance. The Alternative LWC Project Configurations were established on the basis of a uniform topography (of ~79 m elevation or ~4 m above lake level), in the calculation of fill volumes required for each footprint. In reality, each footprint requires a much lower elevation to establish the coastal wetland areas proposed for each of the two creeks. As such, fill that is not required for placement in the wetland areas must be accommodated on the remaining adjacent terrestrial lands within the Alternative LWC Project Configurations in order to retain the balance between areas of cut (low-lying areas) and fill (upland areas). The fill volume balance will not be undertaken for each Alternative, but the need to maintain this balance in cut and fill will be considered when establishing maximum wetland sizes in the development of the Alternative LWC Project Configurations. However, the following key principles will only be considered at the refinement of the Preferred Alternative stage.

Key Principles (in refining a Preferred Alternative):

- **Elevation changes:** The ground should be designed to include a variety of heights and public viewing points. Small hills can be created to diversify habitats. They can be used to direct or deter public access to particular areas. Hills are typically drier sites and could be suitable for meadow habitat. Sheltered areas between hills are more suitable to

forests. Hills are typically drier sites and could be suitable for meadow habitat. Sheltered areas between hills are more suitable to forests.

- **The ground should not be flat (hummocky topography):** There should be smaller pockets of ground that rise and fall similar to what would be found in an area that has not been disturbed by development. Small areas with changes in height create specialized areas for plants and animals called microhabitat. Microhabitat can be more sheltered and have special conditions that develop specialized wildlife, plants and soil.
- **Bluffs:** Small hills with one very steep face are natural on shorelines and provide habitat for certain wildlife, birds and plants, such as the Bank Swallow. Bluffs can also act to impair access to restricted areas (e.g., around the WWTF).

5.2.2.8 Connect to Adjacent Natural Areas

Being able to establish linkages and connections between habitat types is critical in allowing for species to migrate and to provide resources for the various activities and life stages for wildlife. Mammals such as White-tailed deer and others use the natural areas along creeks to move south from the Oak Ridges Moraine to Lake Ontario and may make different uses for creek, wetland, meadow and forest habitat. Species such as frogs, and turtles would be able to use the treed swamp as a migratory corridor to be able to access one marsh area to another. Mink would be able to access meadows from both beach and wetland areas. Birds migrating across Lake Ontario are able to home in on natural greenspaces along the shoreline. Providing diverse habitat types, the LWC Project has the potential to provide perching and resting areas for birds, as well as foraging areas for migratory and resident birds. Some species would also be able to nest and reproduce in the various habitat types. Allowing for a diversity of complementary and accessible habitats within an area provides better opportunities for establishing migration corridors and providing the necessary resources for resident and migratory species.

Key Principles:

- The new natural areas should connect directly to existing natural areas (i.e. Applewood Creek, Serson Creek, the Lake Ontario shoreline, Arsenal Lands, Marie Curtis Park and Etobicoke Creek) to allow wildlife movement.
- The LWC Project should provide important connections between land and water ecozones: from the beach to land and from the creeks/wetlands to land.
- Forests and meadow habitats should provide complementary habitat functions for a wide range of species and activities.
- The LWC Project should provide important stopover habitat for species migrating across Lake Ontario and habitat for species migrating along the shoreline.

5.2.3 Public Access Features

Consultation with the public, the CLC, the EA technical team and the TAC identified a multi-use recreational trail (i.e. a trail that is shared by bicycles and pedestrians) as the key building block to provide access to and along the waterfront.

A multi-use recreational trail is the main component of the access objective for the LWC Project. Based on consultation with the public it was determined that the trail should connect parks in the east (e.g. Marie Curtis Park) to future green space associated with Inspiration Lakeview. The trail system could include secondary and tertiary trails feeding off the multi-use trail that permit viewing of the new naturalized areas, but would be designed in a way that would not negatively affect the function of natural areas. Public feedback indicated the following desired elements of the trail:

- Lookouts from the LWC Project study area back to the cities of Mississauga and Toronto;
- Provide access to the water's edge;
- Allow for passive recreation including birding, fishing, picnicking, etc.;
- Be designed in a way that considers public safety in relation to the shoreline and isolated parts of the trail; and
- Consider design options that would isolate pedestrians and cyclists.

Utilizing the design information provided by the ecology team and feedback from the public and stakeholders on desired viewsheds, recreation opportunities, safety and security concerns, the LWC EA Technical Team layered the individual building blocks onto the five LWC Project alternative footprints.

5.2.4 Layering Design Elements within the Project Footprints

Based on the analysis conducted in Sections 5.2.1, 5.2.2 and 5.2.3, the LWC EA Technical Team identified wetland, forest, meadow, treed swamp and beach as the key ecological building blocks required to meet the LWC Project goal and objectives. In addition to the ecological building blocks, inclusion of a multi-use recreational trail system would provide improved public access to and along the waterfront.

With the individual building blocks identified, the next step in the process of alternative generation was to arrange the building blocks in logical locations within each of the alternative footprints based on the guidance provided by the public, stakeholders and the LWC EA technical team.

There were a number of considerations that were used to place the design elements including public/stakeholder feedback and ecological constraints identified by the LWC EA technical team. These considerations included:

- Public desire for clear views towards the lake and city viewscapes from different vantage points including the future Inspiration Lakeview site;
- Public desire for views from the lake (boaters) to the site;
- Public desire for improved access to the water and passive recreation opportunities;
- WWTF desire for site security;
- Public desire to buffer views of the WWTF; and
- Ecological constraints around the placement of wetlands since they need to be connected to upland water sources (i.e. river inputs) and to the lake (lake inputs).

As an initial step, the 2 million m^3 fill volume was used as the base amount for each alternative to do an initial placement of the various building blocks. Once the building blocks were established on the 2 million m^3 footprints, they could be layered onto the smaller fill volumes to determine if the optimum and minimum size requirements for ecological building blocks (see Section 5.2.1) could fit on the smaller footprints.

5.2.4.1 Wetlands

Wetlands require water sources to ensure long term function so the placement of wetlands was constrained by the location of hydrologic inputs (i.e. streams and Lake Ontario). Thus, it was determined that wetlands should be placed first to ensure they are located in areas that provide the appropriate hydrological conditions and the other building blocks could be placed around them. Utilizing the general size guidelines of approximately 7 ha for wetlands, conceptual wetlands configurations were overlain on the project footprints using ArcGIS software (Figure 5.4).

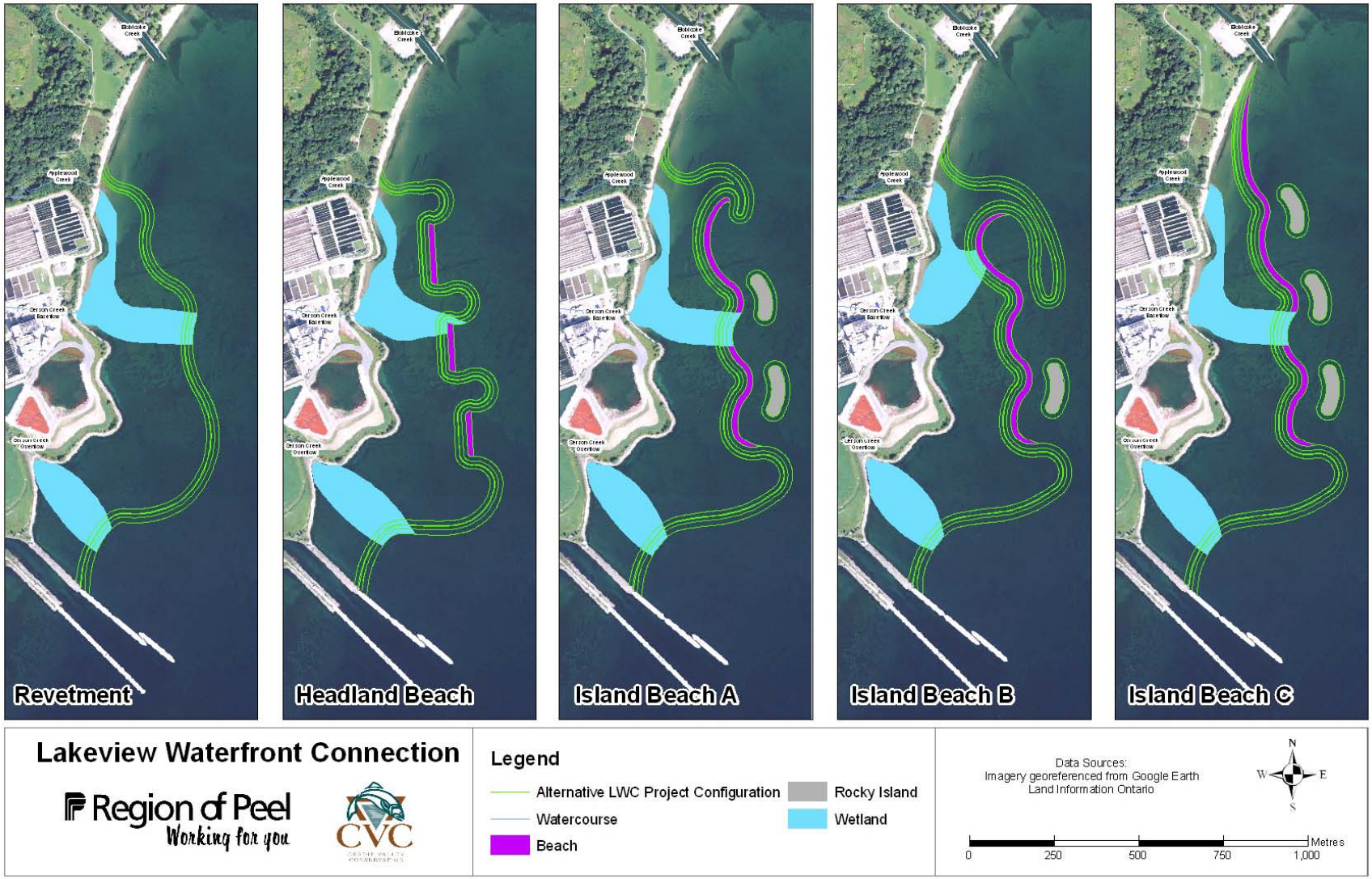
Wetlands were located according to the physical constraints for wetland function (i.e. existing hydraulic inputs from upstream aquatic systems and connection to Lake Ontario). The three upstream aquatic systems that provide wetland inputs include Applewood Creek, Serson Creek storm drain and Serson Creek overflow channel.

The result was two wetland patches on each alternative footprint; one wetland patch in the south connecting the Serson overflow channel and Lake Ontario; and a larger wetland patch in the north connecting both the Serson baseflow channel and Applewood Creek to Lake Ontario. The connection between the Serson baseflow channel and Applewood Creek was considered

necessary since future flows from the Serson baseflow channel could be diverted through the Serson overflow channel. This would eliminate the Serson baseflow channel as an input to the northern wetland making the connection of Applewood Creek necessary to maintain a permanent upstream hydrologic input.

Since each alternative footprint has variable shoreline configurations, the wetlands took on slightly different shapes for the different alternatives but the general layout and location is similar for each. The primary difference between alternatives is the location of the outlet to Lake Ontario depending on the location of protected shoreline. With the wetlands placed according to their physical constraints, other building blocks could then be placed around them to meet the ecological and recreation objectives of the LWC Project.

Figure 5.4 Wetland Layers Added to the Alternative LWC Project Configurations

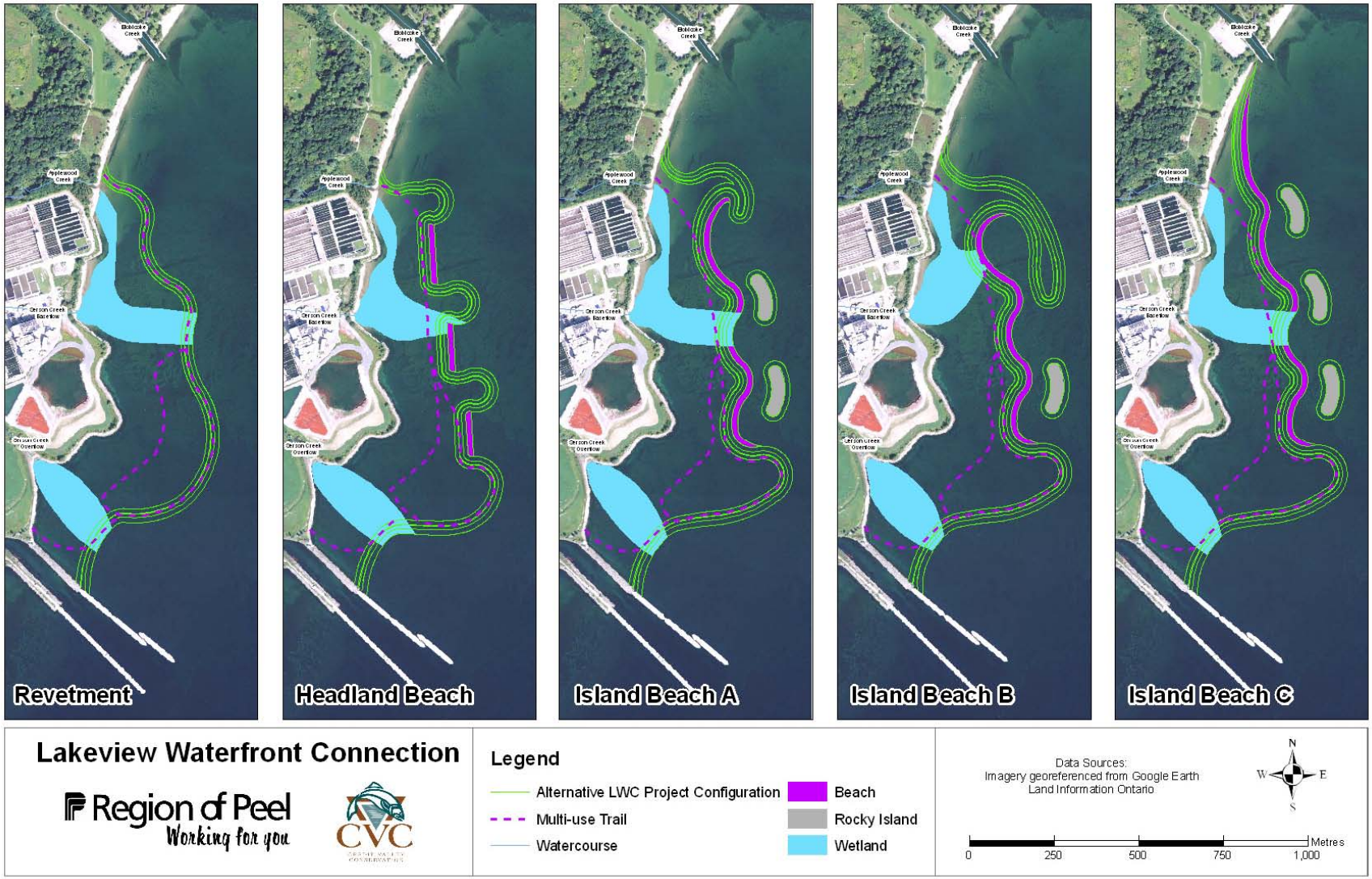


5.2.4.2 Recreational Trail

Based on feedback from the public, the multi-use recreational trail was placed close to the water's edge to permit access to Lake Ontario and provide the desired views of the lake and the City of Toronto to the east. It was also important to place the trail along the water's edge to enable close access for future maintenance of the shoreline works. The trail has a connection to Marie Curtis Park and connects back to the existing landbase in the south adjacent to the OPG pier that will provide a potential waterfront connection between the existing waterfront trail and the future Inspiration Lakeview development. There is also potential for secondary and/or seasonal trails within each footprint.

The trail was primarily located outside of wetland habitat to minimize specialized construction considerations such as the need for boardwalks; however, the trail crosses wetland areas for each alternative. The trail will be designed to cross wetlands at the narrowest point to minimize disruption. The conceptual locations for the trail on each footprint are shown on Figure 5.5.

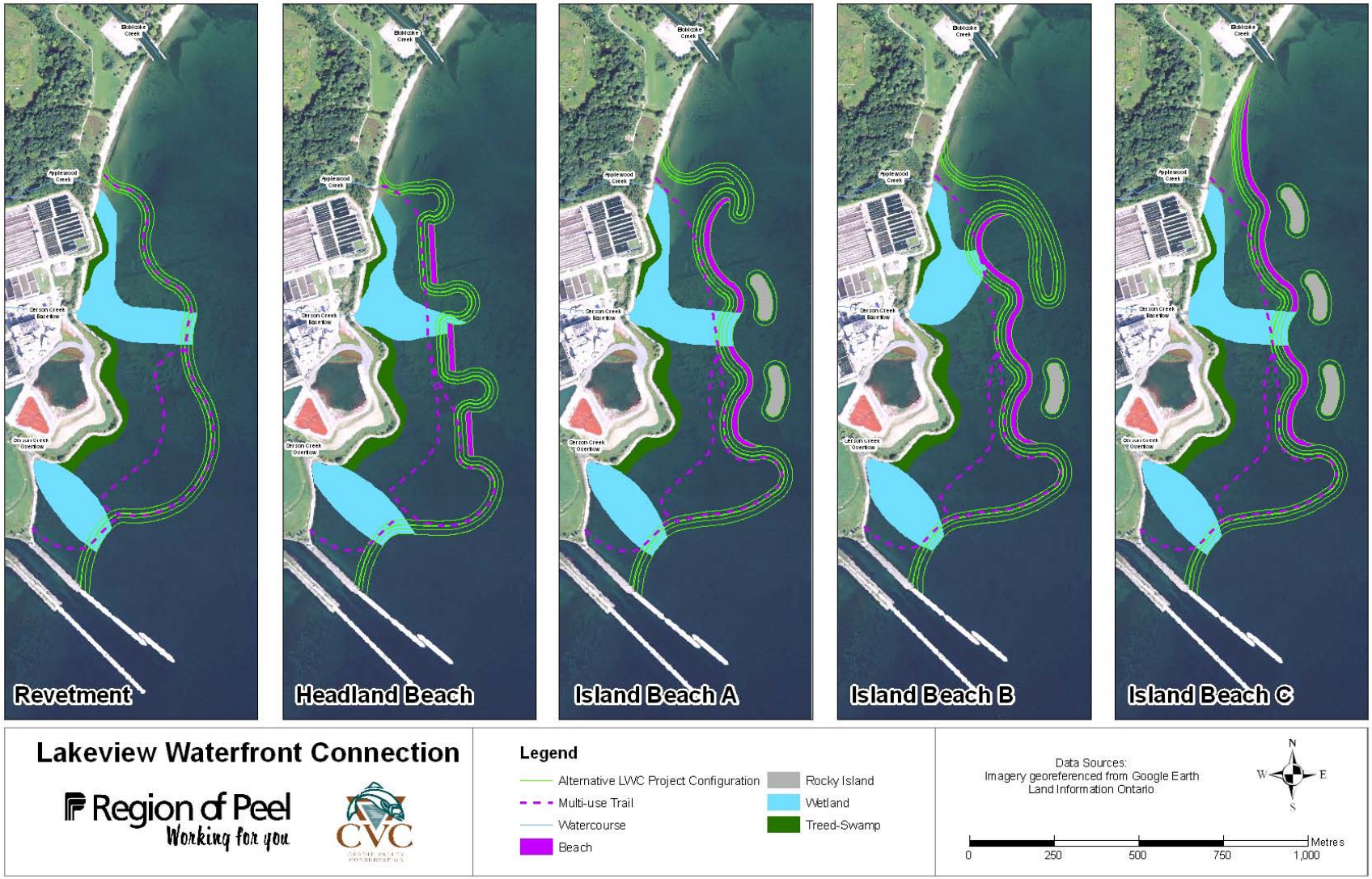
Figure 5.5 Trail Layers Added to the Alternative LWC Project Configurations



5.2.4.3 Treed Swamp

The public identified a desire to screen views of the WWTF from the waterfront and the WWTF identified a need for site security. Placement of a treed swamp in front of the WWTF was considered a good way to meet both desires. This would discourage public access to the WWTF from the new waterfront since wet habitats discourage foot access. Inherent in the design of a wet forest is a lower ground elevation which will also provide a slope transition to the WWTF that will serve as an additional barrier to public access. The trees included in the wet forest habitat would provide a visual barrier of the WWTF from the waterfront that would meet the public's desire for a visual screen. Thus, a treed swamp was placed in front of the WWTF providing a hydrologic connection between the two wetland areas and creating an access barrier. This location for the treed swamp is common to all five alternatives with slight variation in the total size due to variations in wetland shape as shown on Figure 5.6 below.

Figure 5.6 Treed Swamp Layers Added to the Alternative LWC Project Configurations



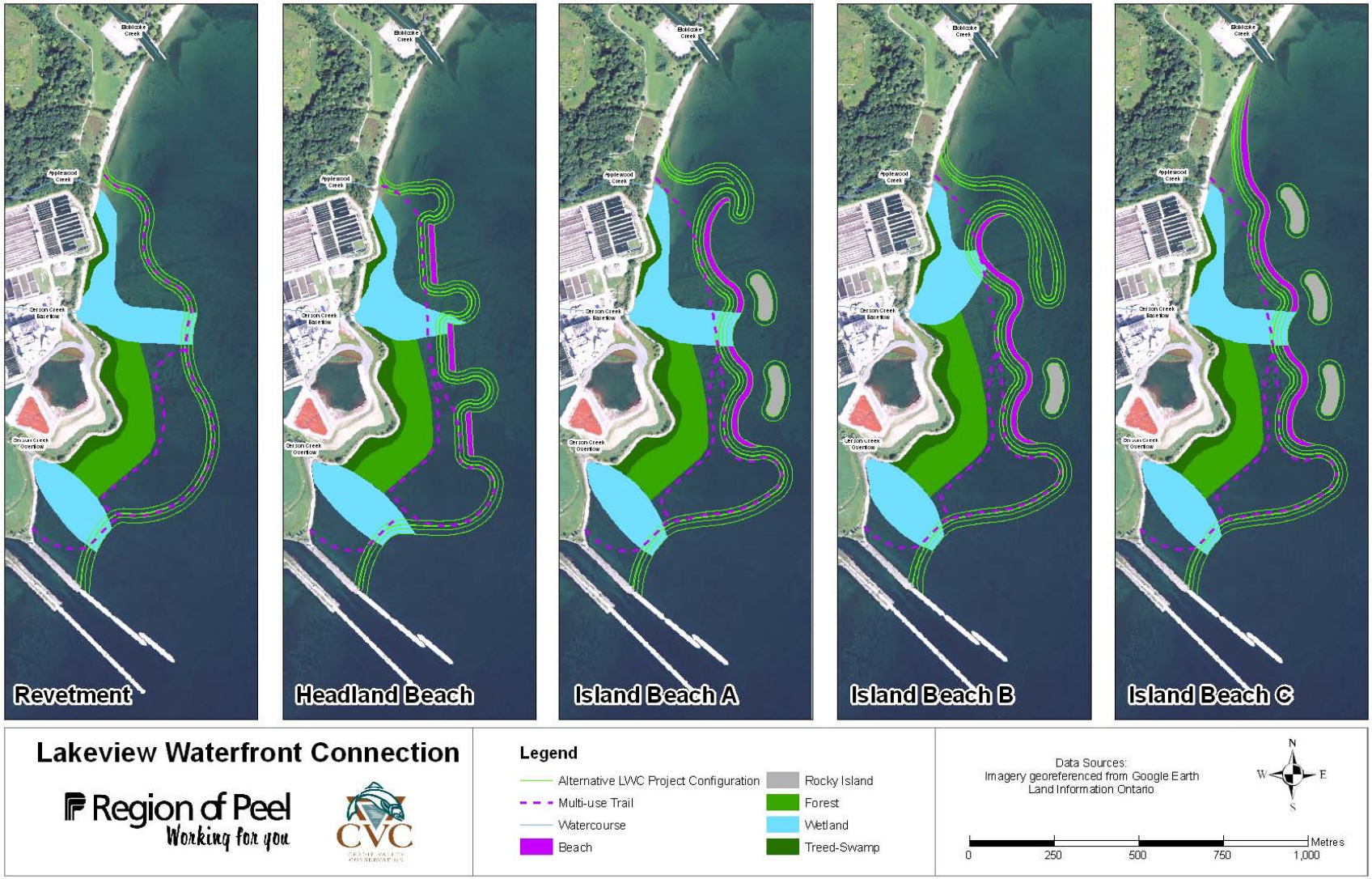
5.2.4.4 Forest

The LWC EA ecology team identified a target minimum requirement of 4 ha of forest to effectively function as wildlife refuge. From an ecological perspective, there were no specific requirements for the location of the forest building block, but the ecologists noted that a larger intact block was preferred over smaller blocks broken up by trails and distributed around the site. The ecologists also identified that coastal forest habitat frequently occurs setback from the harsh shoreline conditions along north shore of Lake Ontario with a band of meadow providing a physical separation and transition between the forest and shoreline conditions.

The public expressed concern that tall trees could block views of the lake from the future Inspiration Lakeview site and requested that forest blocks should be located away from the southern portion of the LWC Project Study Area. The public also requested that forest blocks be concentrated in the northern half of the LWC Project Study Area to avoid blocking views of the lake from the recreational trail. Keeping the forest north of the trail would also discourage undesirable activities and improve visibility to promote safety.

Based on the input from the ecology team and the public, a minimum 4 ha of forest habitat was placed south of the wet forest, between the two wetland features. This location provides additional screening of the WWTF and avoids blocking views towards Lake Ontario from the future Inspiration Lakeview site. This location for the forest is common to all five alternatives with slight variation in the total size due to variations in wetland shape as shown on Figure 5.7.

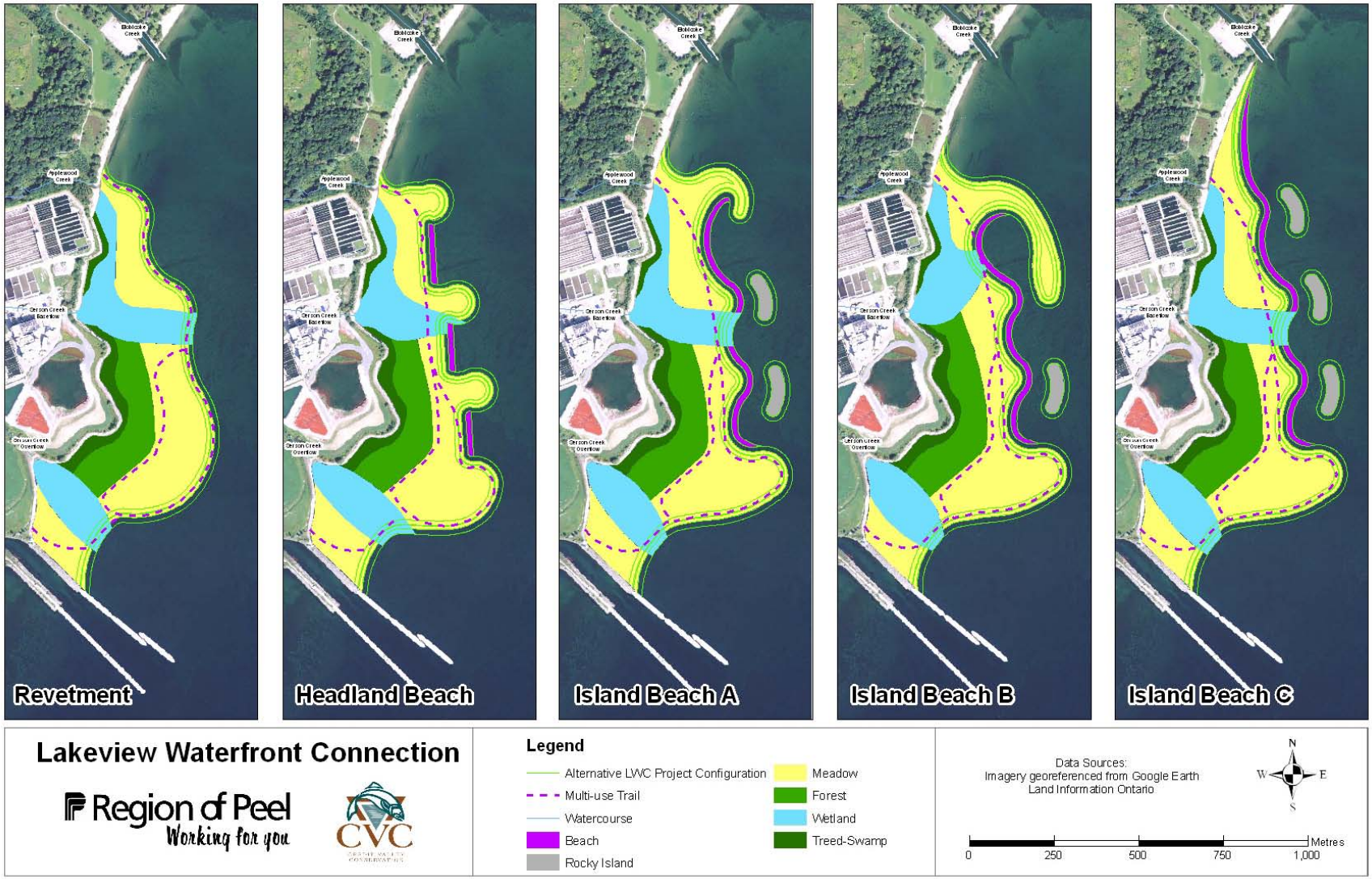
Figure 5.7 Forest Layers Added to the Alternative LWC Project Configurations



5.2.4.5 Meadow

The LWC Project EA ecologists identified minimum requirement of 10 ha of meadow habitat to effectively function as wildlife and bird habitat. Meadow habitats are also frequently found immediately adjacent to the shoreline given their robustness of surviving the more exposed harsh conditions along Lake Ontario shoreline. Locating the meadow habitat along the shoreline of each alternative also allows for the trail to provide good views of Lake Ontario and keeps the trail out of forested areas that could be associated with undesirable uses and safety concerns. This location of meadow habitat along the shoreline is common to all alternatives with variation in the total size due to variations in shoreline and wetland shape as shown on Figure 5.8.

Figure 5.8 Meadow Layers Added to the Alternative LWC Project Configurations



5.3 STEP 3 – COMPARE AND EVALUATE SHORT LIST OF ALTERNATIVES

The purpose of Step 3 was to evaluate the five alternatives to identify one preferred alternative to be carried forward for more detailed technical analysis as part of Step 4. This evaluation of alternatives was accomplished by establishing an order of preference between the five alternatives developed in Steps 1 and 2 (Figure 5.8). The evaluation method used criteria and indicators to structure information and facilitate the comparison of alternatives against each other by LWC Project objectives. The evaluation criteria and indicators were developed to reflect LWC Project objectives through consultation with a wide range of regulators, stakeholders and members of the public.

The comparison of alternatives required the explicit consideration of trade-offs thereby keeping the more desirable attributes over those less desirable. The alternative identified as preferred at the end of Step 3 has the greatest potential to meet all of the objectives of the LWC Project. The detailed assessment of the preferred alternative is presented in Step 4.

5.3.1 Evaluation Methodology

The comparative evaluation of alternatives involved three tasks as detailed below:

1. Development of comparative evaluation criteria and indicators;
2. Assessment of effects; and
3. Comparative evaluation to identify the alternative(s) with the highest potential to meet project objectives.

5.3.1.1 Criteria and Indicators

The evaluation criteria and indicators used for the comparative evaluation were developed by the LWC EA Technical Team and reviewed by a number of stakeholders including:

a) TRCA, CVC and Region of Peel;
b) City of Mississauga and City of Toronto staff;
c) The public;
d) Interest groups;
e) Aboriginal groups; and
f) Federal and provincial regulatory agencies.

5.3.1.2 Effects Assessment

In general, the data for the effects assessment were collected as part of baseline studies (see Chapter 3). Baseline data were used with the descriptions of the alternatives and the critical assumptions to determine how each alternative would potentially affect the environment. For many of the indicators the data were collected by measuring areas or linear distances using GIS. Table 5.1 details how the effects assessment was carried out for each criterion included in the evaluation. The indicators for each criterion are presented in Table 5.1.

For some of the criteria and indicators, the effects assessment concluded that there were no differences between any of the alternatives. These criteria and/or indicators were screened from the evaluation as they do not assist in decision-making. Table 5.1 details which criteria and/or indicators were screened from the evaluation.

The LWC Project, as articulated by the LWC Project objectives, is about taking a degraded area of the Mississauga waterfront and improving aquatic and terrestrial habitat and public access in coordination with other planning initiatives. The evaluation of 'Alternative Methods' was structured to assess the ability of each alternative to meet these LWC Project objectives. It is recognized that there will be minor negative effects associated with construction; however; the Preferred Alternative would result in overall net benefits to the environment and community. The purpose of the effects assessment is to measure those benefits between alternatives.

Benefits are measured in the evaluation and as part of the trade-offs. It was assumed that the nuisance effects associated with construction were common to all alternatives, easily mitigated using standard construction practices (Appendix C) and thus, did not help to distinguish between alternatives. Therefore, effects from construction were not included in the evaluation.

Once the effects assessment was completed, the alternatives were rated for each indicator as most preferred, moderately preferred and least preferred. In general this was done by looking at the differences between the alternatives vis-à-vis the confidence level of the assessment methods. If the differences were very small the alternatives were rated the same; only major differences are reflected in the ratings.

The full and complete results of the effects assessment and ratings are reported in Appendix D (complete evaluation matrix minus criteria that are screened and deferred to the assessment of the preferred alternative).

5.3.1.3 Comparative Evaluation

The comparative evaluation combined the information presented by indicator to reflect a preference by criterion and then combined the information presented by criterion to reflect a preference for each objective. Finally, the preferences by objective were combined to present the preferred alternative, in effect rolling up the detailed information into a decision. At each point any trade-offs between alternatives are identified and discussed in the following sections with the intent of providing the reader with a traceable decision-making process. The criteria and indicators used for the evaluation are presented by objective in Tables 5.1, 5.3, 5.5 and 5.7 and Appendix D.

5.3.2 Results of the Comparative Evaluation by Objective

Sections 5.3.2.1 through 5.3.2.5 detail the comparative evaluation of alternatives by objective to identify trade-offs and create a reasoned argument as to which alternative(s) are most preferred for each objective. Each section states what the objective is intended to measure followed by a discussion of trade-offs between indicators within criteria, a discussion of trade-offs between criteria and the determination of the rating of alternatives for the objective. Please note that the discussion of effects assumes that mitigation measures have been applied to address any potential effects and that construction effects and mitigation measures are common to all alternatives.

5.3.2.1 Naturalization

The criteria and indicators for the naturalization objective measure the ability of each alternative to establish a diverse range of terrestrial and aquatic ecosystem habitat. The evaluation of the naturalization objective is based on three criterion:

1. change in shoreline character;
2. ability to create functional habitat blocks; and
3. ability of the alternative to be self-compensating with respect to fish habitat.

Table 5.1 provides the comparative evaluation for the naturalization objective. A more detailed evaluation table is provided in Appendix D.

Table 5.1 Comparative Evaluation Table – Naturalization

Objective	Criteria	Indicator(s)	Alternatives				
			Revetment	Headland	Island Beach A	Island Beach B	Island Beach C
Naturalization	Change in shoreline character	Change in diversity of shoreline types	• uniform revetment shoreline with no diversity • no new beach is created • loss of 363 m of existing beach • overall loss of shoreline diversity	• 449 m of beach created • a similar length of beach lost • remaining shoreline is revetments • no change in shoreline diversity	• 847 m of beach created • 402 m of lee island shoreline created • 1656 m of revetment created • 28% increase in the amount of beach versus hardened shoreline • 2% increase in beach overall • increased diversity created by lee island shoreline.	• 935 m of beach created • 518 m of lee island shoreline created • 1724 m of revetment created • 29% increase in the amount of beach versus hardened shoreline • 3% increase in beach overall • increased diversity created by lee island shoreline.	• 1307 m of beach created • 515 m of lee island shoreline created • 1413 m of revetment is created • 40% increase in the amount of beach versus hardened shoreline • 5% increase in beach overall • increased diversity created by lee island shoreline.
		Irregularity of shoreline to provide nearshore forage fish habitat	• 1.3 times more irregular than a straight linear shoreline	• 1.7 times more irregular than a straight linear shoreline	• 2.3 times more irregular than a straight linear shoreline	• 2.4 times more irregular than a straight linear shoreline	• 2.1 times more irregular than a straight linear shoreline
		Ease of access to water for wildlife	• poor access for wildlife due to revetments	• easier access provided for wildlife at beaches	• easier access provided for wildlife at beaches	• easier access provided for wildlife at beaches	• easier access provided for wildlife at beaches

Table 5.1 Comparative Evaluation Table – Naturalization (Cont'd)

Objective	Criteria	Indicator(s)	Alternatives				
			Revetment	**Headland**	**Island Beach A**	**Island Beach B**	**Island Beach C**
Naturalization	**SUMMARY**		**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**
	Ability to create functional habitat blocks	Ability to meet minimum habitat area guidelines: 4 ha of forest; 7-8 ha of wetland; and 10 ha of meadow.	• Forest:6.7 ha • Wetland:8.0 ha • Meadow:16.0 ha	• Forest:6.4 ha • Wetland:7.7 ha • Meadow:17.0 ha	• Forest:6.7 ha • Wetland:7.8 ha • Meadow:18.2 ha	• Forest:7.2 ha • Wetland:7.7 ha • Meadow:18.5 ha	• Forest:6.7 ha • Wetland:7.8 ha • Meadow:18.2 ha
		Qualitative assessment of habitat created	• does not provide isolated wildlife refuge areas • does not provide sheltered and diverse shoreline habitats	• does not provide isolated wildlife refuge areas • provides moderately sheltered and diverse shoreline habitats	• provides some isolated wildlife refuge areas on the islands • provides moderately sheltered and diverse shoreline habitats	• provides some isolated wildlife refuge areas on the islands • provides well sheltered and diverse shoreline habitats	• provides the most isolated wildlife refuge areas on islands • provides moderately sheltered and diverse shoreline habitats

Table 5.1 Comparative Evaluation Table – Naturalization (Cont'd)

Objective	Criteria	Indicator(s)	Alternatives				
			Revetment	**Headland**	**Island Beach A**	**Island Beach B**	**Island Beach C**
Naturalization	**SUMMARY**		**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**
	Ability of alternative to be self-compensating with respect to fish habitat	Area of aquatic habitat lost or changed (ha)	• 30.7 ha	• 32.0 ha	• 34.2 ha	• 34.8 ha	• 34.7 ha
		HAAT model estimates of area requiring compensation lost (ha)	• Requires 7.2 ha of habitat compensation	• Requires 6.1 ha of habitat compensation	• Requires 6.7 ha of habitat compensation	• Requires 4.7 ha of habitat compensation	• Requires 6.7 ha of habitat compensation
		Area of aquatic Habitat Lost compared to HAAT Model estimate of area requiring compensation.	• 4.3 ha of fill / 1ha of compensation	• 5.2 ha of fill / 1 ha of compensation	• 5.1 ha of fill / 1 ha of compensation	• 7.4 ha of fill / 1 ha of compensation.	• 5.1 ha of fill / 1 ha of compensation
	SUMMARY		**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**	**MODERATELY PREFERRED**

Change in Shoreline Character

For the criteria "change in shoreline character" there were three indicators used to evaluate each Alternative LWC Project Configuration:

1. Change in diversity of shoreline types;
2. Irregularity of shoreline to provide nearshore forage fish habitat; and
3. Ease of access to water for wildlife.

Change in diversity of shoreline types measures the amount of beach created or lost, the amount of revetment created or lost and the amount of change in both beach and revetment compared to the existing shoreline. There is a desire for greater shoreline diversity and Alternative LWC Project Configurations that result in greater shoreline diversity are preferred. Beaches are preferred to revetments along the shoreline due to their function as both terrestrial and aquatic habitat and their function in providing access to wildlife between terrestrial and aquatic habitat.

Irregularity of shoreline to provide nearshore forage fish habitat is a ratio that describes the irregularity of a shoreline compared to the straight length of shoreline. The more irregular a shoreline the more nearshore forage fish habitat is available. The higher the number the more preferred the alternative.

Some wildlife requires easy and safe access to the water for different aspects of their lifecycle. Different shoreline treatments create or discourage easy access. The indicators "ease of access to water for wildlife" measures each alternative's ability to provide access between terrestrial and aquatic environments based on the presence or absence of beaches.

The Revetment alternative provides a uniform revetment shoreline with no diversity. No beach is created and there is a loss of 363 m of existing beach. The Revetment alternative results in an overall loss of shoreline diversity, the least irregular shoreline and no easy access between the terrestrial and aquatic environment for wildlife since there are no beaches.

The Headland Beach alternative provides 449 m of new beach with a similar length of existing beach is lost. The remaining shoreline is revetments. The Headland Beach alternative provides no change in shoreline diversity, a more irregular shoreline than the Revetment alternative and provides easier access (compared to Revetment) between the terrestrial and aquatic environment for wildlife since cobble beaches are proposed for this alternative.

The Island Beach A alternative provides 847 m of beach, 402 m of lee island shoreline and 1656 m of revetment. There is a 28% increase in the amount of beach versus hardened shoreline and a 2% increase in beach overall. Increased diversity is also created by the addition of the lee island shoreline. The Island Beach A alternative provides a more irregular shoreline than both the Revetment and Headland Beach alternative and provides easier access (compared to Revetment) between the terrestrial and aquatic environment for wildlife since cobble beaches are proposed for this alternative.

The Island Beach B alternative provides 935 m of beach, 518 m of lee island shoreline and 1724 m of revetment. There is a 29% increase in the amount of beach versus hardened shoreline and a 3% increase in beach overall. Increased diversity is also created by the addition of the lee island shoreline. The Island Beach B alternative provides a more irregular shoreline than both the Revetment and Headland Beach alternatives and a similar amount of irregularity as Island Beach A. Island Beach B provides easier access (compared to Revetment) between the terrestrial and aquatic environment for wildlife since cobble beaches are proposed for this alternative.

The Island Beach C alternative provides 1307 m of beach, 515 m of lee island shoreline and 1413 m of revetment. There is a 40% increase in the amount of beach versus hardened shoreline and a 5% increase in beach overall. Increased diversity is also created by the addition of the lee island shoreline. The Island Beach C alternative provides a more irregular shoreline than both the Revetment and Headland Beach alternatives and a similar amount of irregularity as Island Beach A and Island Beach B. Island Beach C provides easier access (compared to Revetment) between the terrestrial and aquatic environment for wildlife since cobble beaches are proposed for this alternative.

While the Island Beach C alternative results in highest amount of overall beach created, much of this newly created beach is a result of covering the existing sand beach at Marie Curtis Park. When compared to the existing conditions, Island Beach A, Island Beach B and Island Beach C result in a slight increase in overall beach compared to the existing shoreline so all three are considered most preferred. The Headland Beach alternative results in no net gain or loss in beach compared to the existing shoreline so it considered moderately preferred while the Revetment Alternative results in a net loss of beach compared to existing conditions and is considered least preferred.

Based on the results for each indicator described above, Island Beach A, Island Beach B and Island Beach C Alternative LWC Project Configurations were ranked “most preferred” for the criteria “change in shoreline character”. Headland Beach was ranked “moderately preferred” and Revetment was ranked “least preferred”.

Ability to Create Functional Habitat Blocks

For the criteria "ability to create functional habitat blocks" there were two indicators used to evaluate each Alternative LWC Project Configuration:

1. Ability to meet minimum habitat area guidelines (7-8 ha of wetland; 4 ha of forest; and 10 ha of meadow); and
2. Qualitative assessment of habitat created.

Minimum habitat sizes have been provided as a guideline to ensure appropriate levels of ecological function within the LWC Project Study Area. Meeting these minimum habitat area guidelines will provide adequate functional habitat for each broad ecological building block.

Ecological function is related to the relative quality of the new habitat created. Habitat patch size, shape, potential for human disturbance through trails and infrastructure dictate future ecological function. Alternative LWC Project Configurations deemed to have higher quality habitat will be scored higher.

For the indicator "ability to meet minimum habitat area guidelines" each of the Alternative LWC Project Configurations meets the minimum habitat size guidelines identified by the ecology team. However, differences between the alternatives are identified through a qualitative assessment of quality of the habitat created based on their ability to provide isolated wildlife refuge areas and sheltered, diverse shoreline habitats.

The Revetment and Headland Beach alternatives do not provide isolated wildlife refuge areas (i.e. islands), however the Headland Beach alternative does provide moderately sheltered and diverse shoreline habitats where the Revetment alternative does not.

All three Island Beach alternatives provide some degree of wildlife refuge and sheltered and diverse shoreline habitat. There are trade-offs between each of the Island Beach alternatives based on the number of islands created (wildlife refuge) and the amount of sheltered and diverse shoreline habitat. While Island Beach B provides the most sheltered and diverse shoreline habitat, it only has one island to provide wildlife refuge. Island Beach C had three islands providing the most wildlife refuge, but has less sheltered and diverse shoreline habitat than both Island Beach A and Island Beach B alternatives.

Since each of the Island Beach alternatives provide a mix of wildlife refuge and sheltered and diverse shoreline habitat, they were each scored as "most preferred". Although the Headland Beach alternative does not provide wildlife refuge, it was scored "moderately preferred" since it does provide sheltered and diverse shoreline habitat. Revetment was scored "least preferred" since it does not provide sheltered and diverse shoreline habitat nor wildlife refuge.

Ability of Alternative to be Self-Compensating with Respect to Fish Habitat

For the criteria "ability of alternative to be self-compensating with respect to fish habitat" there were three indicators used to evaluate each Alternative LWC Project Configuration:

1. Area of aquatic habitat lost or changed;
2. HAAT model estimates of area requiring compensation lost; and
3. Area of aquatic habitat lost compared to HAAT model estimate of area requiring compensation.

Land creation activities will result in a loss of aquatic habitat and the area of loss is a key consideration in the ability of the LWC Project to self-compensate for this loss. The conservation authorities would like to adhere to the principle of self-compensation in that any habitat lost should be replaced preferably with higher quality habitat in the event that habitat area created is not equal to area lost. The indicator "area of aquatic habitat lost or changed" measures the area of aquatic habitat lost based on the footprint of each Alternative LWC Project Configurations.

Different shoreline types and their resulting footprints have intrinsic differences in ecological features and functions and thus, their ability to be self-compensating from a fish habitat perspective. The indicator "HAAT model estimates of area requiring compensation lost" will determine which alternatives are better able to be self-compensate by minimizing the net loss of habitat.

The "area of aquatic habitat lost compared to HAAT model estimate of area requiring compensation" indicator measures the amount of fill that would occur for each alternative before 1 ha of habitat compensation is required. Thus, the two indicators listed above are standardized where the greater the fill area, the higher intrinsic habitat quality provided.

The Revetment alternative requires the smallest area of land creation (30.7 ha) but it will require the highest level of offsite habitat compensation due to the lack of functional fish habitat created by the revetment structures. The HAAT analysis indicates that 7.2 ha of like habitat will be required to compensate for the land creation activity, thus, 4.3 ha of land creation can occur before 1 ha of habitat compensation is required.

The Headland Beach alternative requires 32.0 ha of land creation but will require less offsite habitat compensation compared to the Revetment alternative due to more functional fish habitat created by the shoreline configuration and cobble beaches. The HAAT analysis indicates that 6.1 ha of like habitat will be required to compensate for the land creation activity, thus, 5.2 ha of land creation can occur before 1 ha of habitat compensation is required.

The Island Beach A alternative requires 34.2 ha of land creation but will require less offsite habitat compensation compared to the Revetment alternative due to more functional fish habitat created by the shoreline configuration and cobble beaches. The HAAT analysis indicates that 6.7 ha of like habitat will be required to compensate for the land creation activity. Although slightly more habitat compensation is required than for the Headland Beach alternative, slightly more land creation can occur before 1 ha of habitat compensation is required (5.1 ha).

The Island Beach B alternative requires 34.8 ha of land creation but will require less offsite habitat compensation compared to all alternatives due to more functional fish habitat created by the sheltered embayment feature and cobble beaches. The HAAT analysis indicates that only 2.3 ha of like habitat will be required to compensate for the land creation activity, thus, 15.1 ha of land creation can occur before 1 ha of habitat compensation is required.

The Island Beach C alternative requires 34.7 ha of land creation and will require similar offsite habitat compensation as the Headland Beach and Island Beach A alternatives. The HAAT analysis indicates that 3.4 ha of like habitat will be required to compensate for the land creation activity, thus, 10.2 ha of land creation can occur before 1 ha of habitat compensation is required.

The Island Beach B alternative has the greatest area of land creation, but due to the types of habitat created, it is best able to compensate for that loss. Island Beach B requires the least amount of offsite compensation of all alternatives and was ranked as most preferred for the criteria “ability of alternative to be self-compensating with respect to fish habitat”. A combination of the area of land creation and the types of aquatic habitat created results in similar amounts of offsite compensation required for the Headland Beach, Island Beach A and Island Beach C alternatives, thus, these three alternatives were ranked as moderately preferred. The Revetment alternative requires the most offsite compensation and was ranked least preferred.

Summary of Evaluation by Objective - Naturalization

In summary, the Revetment alternative scores lowest for each criterion under the naturalization objective. The three Island Beach alternatives score highest under the naturalization objective with Island Beach B scoring slightly higher with respect to the ability of the alternative to self-compensate for fish habitat. The Headland Beach alternative scores higher than the Revetment for all criteria but lower than or equal to the three Island Beach alternatives for all criterion.

Therefore, for the naturalization objective, Island Beach A, Island Beach B and Island Beach C are ranked “most preferred”; Headland Beach is ranked “moderately preferred” and Revetment is ranked “least preferred”. Table 5.2 presents a summary of the criteria ratings for the naturalization objective.

Table 5.2 Summary of Criteria Ratings for the Naturalization Objective

Objective	Criteria	Alternatives				
		Revetment	**Headland Beach**	**Island Beach A**	**Island Beach B**	**Island Beach C**
Naturalization	Change in shoreline character	Least preferred	Moderately preferred	Most preferred	Most preferred	Most preferred
	Ability to create functional habitat blocks	Least preferred	Moderately preferred	Most preferred	Most preferred	Most preferred
	Ability of alternative to be self-compensating with respect to fish habitat	Least preferred	Moderately preferred	Moderately preferred	Most preferred	Moderately preferred
SUMMARY		**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**

5.3.2.2 Access

The criteria and indicators for the access objective measure the ability of each alternative to provide safe and accessible public linkages to and along the waterfront, including the relocation of the Waterfront Trail close to the water's edge, while allowing for compatible recreational, educational and cultural heritage opportunities. The evaluation of the access objective is based on four criteria:

1. potential for lookout areas;
2. potential for public access to the water's edge;
3. potential for effect from construction on traditional uses of lands by First Nations and Métis; and
4. potential for changes to use of waterfront for recreation.

Table 5.3 provides the comparative evaluation for the access objective.

Two additional criteria were evaluated for the access objective:

1. potential for displacement of built heritage resources due to construction; and
2. potential effects from construction on marine- and land-based archaeological resources.

After evaluating these four criteria for the five LWC Project alternatives, it was determined that there was no difference for any of the alternatives so these criteria were removed from the evaluation table. A detailed evaluation table, including criteria deemed to be equal for each alternative, is provided in Appendix D.

Table 5.3 Comparative Evaluation Table – Access

Objective	Criteria	Indicator(s)	Alternatives				
			Revetment	**Headland**	**Island Beach A**	**Island Beach B**	**Island Beach C**
Access	Potential for lookout areas	Number of opportunities for lookout areas	• continuous lookout opportunities along shoreline • all lookout opportunities are uniform and are perched above water on revetment • excellent opportunities to create raised viewing platform • all views to Lake Ontario unobstructed	• varied lookout opportunities along shoreline • some lookouts perched on revetment some at water's edge • opportunity to create raised viewing platform • views to Lake Ontario from beaches obstructed by headlands	• varied lookout opportunities along shoreline • some lookouts perched on revetment some at water's edge • opportunity to create raised viewing platform • additional lookout opportunities created by hooked peninsula • some views to Lake Ontario from beaches partially obstructed by peninsula	• varied lookout opportunities along shoreline • some lookouts perched on revetment some at water's edge • opportunity to create raised viewing platform • additional lookout opportunities created by hooked peninsula • many views to Lake Ontario from beaches partially obstructed by peninsula	• varied lookout opportunities along shoreline • some lookouts perched on revetment some at water's edge • opportunity to create raised viewing platform • additional lookout opportunities created by hooked peninsula • all views to Lake Ontario unobstructed
	SUMMARY		**MODERATELY PREFERRED**	**LEAST PREFERRED**	**MOST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**
	Potential for public access to water's edge	Percent change in accessible water's edge	• 10% loss of accessible water's edge	• 14% gain of accessible water's edge	• 20% gain of accessible water's edge	• 22% gain of accessible water's edge	• 25% gain of accessible water's edge

Table 5.3 Comparative Evaluation Table – Access (Cont'd)

Objective	Criteria	Indicator(s)	Alternatives				
			Revetment	**Headland**	**Island Beach A**	**Island Beach B**	**Island Beach C**
Access	Potential for public access to water's edge	Potential to create tiered trail system providing seasonal access	• Limited potential	• Excellent potential	• Excellent potential	• Excellent potential	• Moderate potential
		Potential to create multi-use trail connection across area of land creation	• Excellent potential	• Excellent potential	• Excellent potential	• Excellent potential	• Excellent potential
	SUMMARY		**LEAST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**
	Potential for effect from construction on traditional uses of lands by First Nations and Métis	Extent of traditional uses of lands within LWC Project Study Area	• provides access to enhanced river and wetlands • does not provide access to the shoreline	• provides access to enhanced river and wetlands • provides access to the shoreline	• provides access to enhanced river and wetlands • provides access to the shoreline	• provides access to enhanced river and wetlands • provides access to the shoreline	• provides access to enhanced river and wetlands • provides access to the shoreline
	SUMMARY		**LEAST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**

Table 5.3 Comparative Evaluation Table – Access (Cont'd)

Objective	Criteria	Indicator(s)	Alternatives				
			Revetment	**Headland**	**Island Beach A**	**Island Beach B**	**Island Beach C**
Access	Potential for changes to use of waterfront for recreation	Potential for changes to existing recreational activities on the sand beach at Marie Curtis Park west	• alteration of 162 m of existing sand beach	• alteration of 154 m of existing sand beach	• alteration of 244 m of existing sand beach	• alteration of 241 m of existing sand beach	• alteration of 505 m of existing sand beach
		Potential for changes to use for windsurfers and/or kiteboarders	• creates new hazards that did not exist previously • minimal encroachment into MCP West beach	• creates new hazards that did not exist previously • minimal encroachment into MCP West beach	• creates new hazards that did not exist previously • moderate encroachment into MCP West beach	• creates new hazards that did not exist previously • moderate encroachment into MCP West beach	• creates new hazards that did not exist previously • extensive encroachment into MCP West beach
	SUMMARY		**MOST PREFERRED**	**MOST PREFERRED**	**MODERATELY PREFERRED**	**MODERATELY PREFERRED**	**LEAST PREFERRED**

Potential for Lookout Areas

For the criteria "potential for lookout areas" there was one indicator used to evaluate each Alternative LWC Project Configuration: "number of opportunities for lookout areas". Lookout areas (providing views along the shoreline) are an important feature in enhancing public enjoyment of the waterfront. The size and character of the shoreline created will create differences in opportunities for lookouts.

The Revetment alternative provides continuous lookout opportunities along the shoreline. All lookout opportunities are uniform and are perched above water on revetment. Excellent opportunities exist to create raised viewing platforms with unobstructed views to lake. The Revetment alternative does not provide any viewing opportunities from lake level since the entire shoreline is perched on revetment structures and does not provide beach lookouts.

The Headland Beach alternative provides varied lookout opportunities along the shoreline. Some lookouts are perched on revetment and others are at the water's edge. There are opportunities to create raised viewing platforms; however views to lake from beaches are obstructed by headlands.

The Island Beach A alternative provides varied lookout opportunities along the shoreline. Some lookouts perched are on revetment and others are at the water's edge. There are opportunities to create raised viewing platforms and additional lookout opportunities are available on the hooked peninsula; however some views to lake from beaches are partially obstructed by the peninsula.

The Island Beach B alternative provides varied lookout opportunities along the shoreline. Some lookouts are perched on revetment and others are at the water's edge. There are opportunities to create raised viewing platforms and additional lookout opportunities are created by the hooked peninsula; however many views to lake from beaches obstructed by the peninsula.

The Island Beach C alternative provides varied lookout opportunities along shoreline. Some lookouts are perched on revetment and others are at the water's edge. There is an opportunity to create raised viewing platforms and all views to lake are unobstructed.

Based on their provision of varied lookout opportunities (beach and revetment) and predominantly unobstructed views of the lake, Island Beach A and Island Beach C were selected as "most preferred" for the criteria "potential for lookout areas". The Revetment alternative provides unobstructed views of the lake but is less desirable due to a lack of beach lookouts. The Island Beach B alternative provides beach lookouts but some of the lake views from beaches are obstructed by the sheltered embayment feature. Revetment and Island Beach B were ranked as

"moderately preferred" for these reasons. Headland Beach was ranked least preferred as many of the views to the lake are obstructed by the headland features.

Potential for Public Access to Water's Edge

For the criteria "potential for public access to the water's edge" there were three indicators used to evaluate each Alternative LWC Project Configuration:

1. Percent change in accessible water's edge;
2. Potential to create tiered trail system providing seasonal access; and
3. Potential to create multi-use trail connection across area of land creation.

Ease of regular access to the water's edge will enhance public enjoyment of the waterfront, and facilitate a variety of uses. The indicator "percent change in accessible water's edge" measures the change from the existing shoreline to the proposed shoreline in terms of how much access to the water is available to the public.

A key component of east-west public linkages along the waterfront is the Waterfront Trail, which is forced to bypass much of the actual waterfront within the LWC Project Study Area. All Alternative LWC Project Configurations will provide opportunities to change the path of the Waterfront Trail to better connect with trails and parks to the east and west of the LWC Project Study Area and to provide connections back to Lakeshore Road and the adjacent communities. The indicator "potential to create tiered trail system providing seasonal access" is a qualitative measure of the opportunity provided by each Alternative LWC Project Configuration to provide a tiered trail system. The indicator "potential to create multi-use trail connection across area of land creation" determines if a waterfront trail connection across the Project footprint is possible for each alternative.

The Revetment alternative results in a 10% loss in accessible water's edge since some of the currently accessible water's edge at Marie Curtis Park would be covered and replaced with revetment structures. Due to the uniform nature of the revetment structures there is limited potential to create a tiered trail system. Similar to all alternatives, there is excellent potential to create a multi-use trail connection across the site.

The Headland Beach alternative results in a 14% gain in accessible water's edge due to the creation of new beaches. There is excellent potential to create a tiered trail system and a multi-use trail connection across the site.

The Island Beach A alternative results in a 20% gain in accessible water's edge due to the creation of new beaches. There is excellent potential to create a tiered trail system and a multi-use trail connection across the site.

The Island Beach B alternative results in a 22% gain in accessible water's edge due to the creation of new beaches. There is excellent potential to create a tiered trail system and a multi-use trail connection across the site.

The Island Beach C alternative results in a 25% gain in accessible water's edge due to the creation of new beaches. There is moderate potential to create a tiered trail system and excellent potential to create a multi-use trail connection across the site.

Headland Beach, Island Beach A, Island Beach B and Island Beach C were ranked as "most preferred" since they each result in a considerable increase in accessible water's edge compared to existing conditions. Although Island Beach C was only considered to create moderate potential for a tiered trail system, which was offset by its greater provision of accessible water's edge. Revetment was ranked as "least preferred" because it results in a loss of accessible water's edge and limited potential to create a tiered trail system.

Potential for Effect from Construction on Traditional Uses of Lands by First Nations and Métis

The new natural waterfront park must respect and wherever possible enhance traditional uses of lands by First Nations and Métis. For the criteria "potential for effects from construction on traditional uses of lands by First Nations and Métis" there was one indicator used to evaluate each Alternative LWC Project Configuration: "extent of traditional uses of lands within LWC Project Study Area". Based on consultation with Aboriginal communities, there are no traditional uses practiced in the LWC Project Study Area; however, the Mississaugas of the New Credit First Nation indicated a need to access the water. All Alternative LWC Project Configurations provide access to the new stream configurations and wetlands. The Revetment alternative does not provide access to the lake as there are no beaches while the other four alternatives include beaches. For this reason, Revetment has been ranked "least preferred" for this criteria and Headland Beach, Island Beach A, Island Beach B and Island Beach C have been ranked "most preferred".

Potential for changes to use of waterfront for recreation

For the criteria "potential for changes to use of waterfront for recreation" there were two indicators used to evaluate each Alternative LWC Project Configuration:

1. Potential for changes to existing recreational activities on the sand beach at Marie Curtis Park west; and
2. Potential for changes to use for windsurfers and/or kiteboarders.

Creating new parkland in front of the existing sand beach at Marie Curtis Park west could change the character of the area and affect the way current recreational users experience the site. The indicator "potential for changes to existing recreational activities on the sand beach at Marie Curtis Park west" quantitatively measures how each Alternative LWC Project Configuration will change existing recreational uses (i.e. walking, sitting on the beach, etc.) at Marie Curtis Park beach. The existing beach behind each Alternative LWC Project Configuration will remain intact, but may transition to a vegetated community over time with the absence of wave disturbance. The indicator "potential for changes to use for windsurfers and/or kiteboarders" provided a qualitative evaluation of effects specific to these beach users. Each Alternative LWC Project Configuration results in the creation of a new landform that will create a new potential hazard to windsurfers and kiteboarders.

The Revetment alternative results in 162 m of the existing sand beach at Marie Curtis Park affected by the new landform.

The Headland Beach alternative results in 154 m of the existing sand beach at Marie Curtis Park affected by the new landform.

The Island Beach A alternative results in 244 m of the existing sand beach at Marie Curtis Park affected by the new landform.

The Island Beach B alternative results in 241 m of the existing sand beach at Marie Curtis Park affected by the new landform.

The Island Beach C alternative results in 505 m of the existing sand beach at Marie Curtis Park affected by the new landform.

The Revetment and Headland Beach alternatives were ranked as "most preferred" as they result in the least length of impact on Marie Curtis Park beach. Island Beach A and Island Beach B were ranked "moderately preferred" as they result in more of the Marie Curtis Park beach altered as part of the land creation, but still leave over half of the existing beach unaffected. Island Beach C was ranked "least preferred" since it affects the entire length of Marie Curtis Park's western beach.

Summary of Evaluation by Objective - Access

In summary, the Revetment alternative scores "least preferred" for two indicators, "moderately preferred" for one indicator and "most preferred" for one indicator. The Island Beach A scored "most preferred" for three criteria and moderately preferred for one criteria. Island Beach B, Island Beach C and Headland Beach each score higher than the Revetment but lower than Island Beach A. Therefore, for the access objective, Island Beach A is ranked "most preferred"; Headland Beach, Island Beach B and Island Beach C are ranked "moderately preferred" and Revetment is ranked "least preferred". Table 5.4 presents a summary of the criteria ratings for the access objective.

Table 5.4 Summary of Criteria Ratings for the Access Objective

Objective	Criteria	Alternatives				
		Revetment	**Headland Beach**	**Island Beach A**	**Island Beach B**	**Island Beach C**
Access	Potential for lookout areas	Moderately preferred	Least preferred	Most preferred	Moderately preferred	Most preferred
	Potential for public access to water's edge	Least preferred	Most preferred	Most preferred	Most preferred	Most preferred
	Potential for effect from construction on traditional uses of lands by First Nations and Métis	Least preferred	Most preferred	Most preferred	Most preferred	Most preferred
	Potential for changes to use of waterfront for recreation	Most preferred	Most preferred	Moderately preferred	Moderately preferred	Least preferred
SUMMARY		**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**	**MODERATELY PREFERRED**	**MODERATELY PREFERRED**

5.3.2.3 Compatibility

The criteria and indicators for the compatibility objective measure the ability of each alternative to be compatible with existing infrastructure. The evaluation of the compatibility objective is based on two criteria:

1. potential for effects to existing WWTF outfall access points; and
2. ability to maintain/enhance site security at the WWTF.

After evaluating these two criterion against the five Alternative LWC Project Configurations, it was determined that there was no difference for any of the alternatives so these criterion were removed from the evaluation table. All five alternatives result in two manhole access points along the WWTF outfall pipe being covered by fill. This can be mitigated by extending the

manhole access points to the surface of the new landform. By establishing a treed swamp and forest adjacent to the existing shoreline, each alternative is able to maintain/enhance site security by discouraging public access adjacent to the WWTF. There is no measureable difference between alternatives for the compatibility objective so it is concluded that all alternatives are equally preferred for this objective. A detailed evaluation table, including criteria deemed to be equal for each alternative, is provided in Appendix D.

5.3.2.4 Coordination

The criteria and indicators for the coordination objective measure the ability of each alternative to coordinate with and inform other local planning and development initiatives. The evaluation of the coordination objective is based on three criteria:

1. consistency with the Visioning for Inspiration Lakeview;
2. consistency with the Lake Ontario Integrated Shoreline Strategy (LOISS); and
3. consistency with the Beautiful Lake: A Binational Biodiversity Strategy for Lake Ontario (i.e. the Lake Ontario Biodiversity Strategy).

Table 5.5 provides the comparative evaluation for the coordination objective.

Two additional criteria were evaluated for the coordination objective:

1. consistency with the City of Mississauga Waterfront Parks Strategy; and
2. consistency with Marie Curtis Park Revitalization Plan.

After evaluating these two criteria for the five LWC Project alternatives, it was determined that there was no difference for any of the alternatives so these criterion were removed from the evaluation table. A detailed evaluation table, including criteria deemed to be equal for each alternative, is provided in Appendix D.

Table 5.5 Comparative Evaluation Table – Coordination

Objective	Criteria	Indicator(s)	Alternatives				
			Revetment	**Headland**	**Island Beach A**	**Island Beach B**	**Island Beach C**
Coordination	Consistency of alternative with Visioning for Inspiration Lakeview	Ability to integrate alternative with potential plans for OPG's Lakeview site	• Good potential to integrate	• Excellent potential to integrate	• Excellent potential to integrate	• Excellent potential to integrate	• Excellent potential to integrate
	SUMMARY		**MODERATELY PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**
	Consistency of alternative with priorities identified by LOISS	Consistency of alternative with priorities identified by LOISS	• offers the least opportunity to improve the diversity and quantity of terrestrial and aquatic habitat of the shoreline	• offers moderate opportunity to improve the diversity and quantity of terrestrial and aquatic habitat of the shoreline	• offers moderate opportunity to improve the diversity and quantity of terrestrial and aquatic habitat of the shoreline	• offers moderate opportunity to improve the diversity and quantity of terrestrial and aquatic habitat of the shoreline	• offers moderate opportunity to improve the diversity and quantity of terrestrial and aquatic habitat of the shoreline
	SUMMARY		**LEAST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**
	Consistency of alternative with priorities identified by the Lake Ontario Biodiversity Strategy	Consistency of alternative with priorities identified by the Lake Ontario Biodiversity Strategy	• contributes to four of the Conservation Targets	• contributes to five of the Conservation Targets	• contributes to six of the Conservation Targets	• contributes to six of the Conservation Targets	• contributes to six of the Conservation Targets
	SUMMARY		**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**

Consistency with the Visioning for Inspiration Lakeview

For the criteria "consistency with the Visioning for Inspiration Lakeview" there were two indicators used to evaluate each Alternative LWC Project Configuration:

1. Consistency of alternative with Visioning for Inspiration Lakeview; and
2. Ability to integrate alternative with potential plans for OPG's Lakeview site.

The shoreline and Serson Creek within the LWC Project Study Area was identified as a "Green" area within the Inspiration Lakeview Vision Plan. This portion of shoreline was discussed as an area to establish a new continuous waterfront south of the WWTF. Alternatives are ranked based on their consistency with this vision, to ensure that the LWC Project remains consistent with the larger development plans at OPG's Lakeview site.

As a key area for establishing public linkages identified in the Inspiration Lakeview vision, the ability of alternatives to integrate with potential plans for OPG's Lakeview site is important in the larger Inspiration Lakeview planning process. A key message in the Inspiration Lakeview vision is to create opportunities to bring people to the water.

For the criteria "consistency of alternative with Visioning for Inspiration Lakeview", the Revetment alternative was ranked "moderately preferred" since it does not present an opportunity for people to directly access the water due to revetment structures along the entire length of the shoreline. All other alternatives provide direct access to the water and have all been ranked "most preferred".

Consistency with LOISS

For the criteria "consistency with LOISS", alternatives were ranked based on the indicator "consistency of alternative with priorities identified by LOISS". A key element of LOISS is to improve the diversity and quantity of terrestrial and aquatic habitat of the shoreline. The revetment alternative offers the least opportunity for achieving desired improvements to aquatic habitat of the shoreline due a lack of diversity associated with revetment structures. For this reason, the Revetment alternative is ranked "least preferred" for this criterion. All other alternatives are ranked "most preferred" as they offer better opportunities for achieving improvements to aquatic habitat.

Consistency of Alternative with Priorities Identified by the Lake Ontario Biodiversity Strategy

For the criteria "consistency of alternative with priorities identified by the Lake Ontario Biodiversity Strategy", alternatives were ranked based on based on their consistency with the recommendations and targets identified in the Lake Ontario Biodiversity Strategy, to ensure that the LWC Project does not conflict with these elements and helps to meet the objectives of the

Strategy. The three island beach alternatives contribute to six of the conservation target identified in the Strategy. The Headland Beach alternative contributes to five of the targets and the Revetment alternative contributes to four. For this reason, the three island beach alternatives are ranked "most preferred", Headland Beach is ranked "moderately preferred" and Revetment is ranked "least preferred".

Summary of Evaluation by Objective - Coordination

In summary, the Island Beach A Island Beach B and Island Beach C alternatives provide the greatest coordination with other local planning and development initiatives. The three island beach alternatives have been scored as "most preferred" since each of these alternatives ranked "most preferred" for all criteria under the Coordination Objective.

The Headland Beach alternative was only moderately preferred with respect the Lake Ontario Biodiversity Strategy due to the amount of hardened shoreline and the fact that it achieves the fewer Lake Ontario Biodiversity Strategy Conservation Targets when compared to the island beach alternatives. Due to slightly lower scoring than the island beach alternatives on this criterion, Headland Beach was evaluated overall as "moderately preferred" for the Coordination Objective.

The Revetment alternative scored lowest for compatibility with both LOISS and the Lake Ontario Biodiversity Strategy due to the amount of hardened shoreline and the fact that it achieves the fewest Lake Ontario Biodiversity Strategy Conservation Targets when compared to the other alternatives. The Revetment alternative scored "least preferred" overall for the Coordination Objective due to lower scores for these two criteria.

Table 5.6 presents a summary of the criteria ratings for the coordination objective.

Table 5.6 Summary of Criteria Ratings for the Coordination Objective

Objective	Criteria	Alternatives				
		Revetment	Headland Beach	Island Beach A	Island Beach B	Island Beach C
Coordination	Consistency with the Visioning for Inspiration Lakeview	Moderately preferred	Most preferred	Most preferred	Most preferred	Most preferred
	Consistency with LOISS	Least preferred	Most preferred	Most preferred	Most preferred	Most preferred
	Consistency with Lake Ontario Biodiversity Strategy	Least preferred	Moderately preferred	Most preferred	Most preferred	Most preferred
SUMMARY		**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**	**MOST PREFERRED**

5.3.2.5 Fiscal Viability

The criteria and indicators for the fiscal viability objective measure the relative cost differences between the alternatives. Two criteria were used to compare fiscal viability of the alternative:

1. estimated capital cost; and
2. annualized maintenance costs for the naturalized area.

Table 5.7 provides the comparative evaluation for the fiscal viability objective. A detailed evaluation table, including criteria deemed to be equal for each alternative, is provided in Appendix D.

Table 5.7 Comparative Evaluation Table – Fiscal Viability

Objective	Criteria	Indicator(s)	Alternatives				
			Revetment	**Headland**	**Island Beach A**	**Island Beach B**	**Island Beach C**
Fiscal Viability	Estimated Capital Cost	Volume of purchased material	• 552,000 tonnes	• 765,000 tonnes	• 852,000 tonnes	• 935,000 tonnes	• 794,000 tonnes
		Land Cost : Area of waterlot required	• 40.6 ha of waterlot required	• 46.7 ha of waterlot required	• 55.8 ha of waterlot required	• 55.4 ha of waterlot required	• 56.9 ha of waterlot required
	SUMMARY		**MOST PREFERRED**	**MODERATELY PREFERRED**	**LEAST PREFERRED**	**LEAST PREFERRED**	**MODERATELY PREFERRED**
	Annual maintenance costs for naturalized area	Debris management costs	• low potential for debris accumulation due to shoreline configuration	• higher potential for debris accumulation along beaches	• higher potential for debris accumulation within the embayment	• higher potential for debris accumulation within the northern "hook" feature	• higher potential for debris accumulation along beaches
	SUMMARY		**MOST PREFERRED**	**LEAST PREFERRED**	**LEAST PREFERRED**	**LEAST PREFERRED**	**LEAST PREFERRED**

Estimated Capital Cost

For the criteria "estimated capital cost" there was two indicators used to evaluate each Alternative LWC Project Configuration:

1. Volume of purchased material; and
2. Land Cost: Area of waterlot required.

The estimated capital costs for each alternative are measured by the volume of material required for shoreline protection (i.e. revetments and beaches) and the area of waterlots that would need to be purchased. Material required for shoreline protection would not be part of the fill material that would come from Region of Peel or other donor projects so it is referred to as "purchased material".

The Revetment alternative requires the least amount of purchased material and the least area of required waterlot.

Headland Beach and Island Beach C require comparable amounts of purchased material – more than revetment but less than Island Beach A and Island Beach B. Island Beach C requires the most waterlot area (similar waterlot area is required for all island beach alternatives).

Island Beach A and Island Beach B require the most purchased material and are in the upper end of required waterlots.

Based on the trade-offs identified for "estimated capital cost" indicators, Revetment is ranked "most preferred", Headland Beach and Island Beach C are ranked "moderately preferred" and Island Beach A and Island Beach B are ranked "least preferred".

Annual maintenance costs for naturalized area

Differences between alternatives related to maintenance were captured through a qualitative evaluation of each alternative's potential to accumulate debris based on the shoreline configuration. Headland Beach, Island Beach A, Island Beach B and Island Beach C were all considered to have higher maintenance costs than Revetment due to their potential to accumulate debris. Debris accumulation and associated maintenance is considered to be most likely in relation to headland, beach, hook and embayment shoreline features found in each of these alternatives.

Since debris accumulation is considered less likely for the Revetment alternative, it has been ranked "most preferred" with all other alternatives ranked "least preferred".

Summary of Evaluation by Objective – Fiscal Viability

Table 5.8 presents a summary of the criteria ratings for the fiscal viability objective.

Table 5.8 Summary of Criteria Ratings for the Fiscal Viability Objective

Objective	Criteria	Revetment	Headland Beach	Island Beach A	Island Beach B	Island Beach C
Fiscal Viability	Estimated Capital Cost	Most preferred	Moderately preferred	Least preferred	Least preferred	Moderately preferred
	Annual maintenance cost for naturalized area	Most preferred	Least preferred	Least preferred	Least preferred	Least preferred
SUMMARY		**MOST PREFERRED**	**MODERATELY PREFERRED**	**LEAST PREFERRED**	**LEAST PREFERRED**	**MODERATELY PREFERRED**

5.3.2.6 Summary of the Comparative Evaluation of Alternatives

Table 5.9 summarizes the comparative evaluation of alternatives by objective and is a summary of Tables 5.1 through 5.8.

Table 5.9 Summary of Comparative Evaluation by Objective

Objective	Revetment	Headland Beach	Island Beach A	Island Beach B	Island Beach C
Naturalization	LEAST PREFERRED	MODERATELY PREFERRED	MOST PREFERRED	MOST PREFERRED	MOST PREFERRED
Access	LEAST PREFERRED	MODERATELY PREFERRED	MOST PREFERRED	MODERATELY PREFERRED	MODERATELY PREFERRED
Coordination	LEAST PREFERRED	MODERATELY PREFERRED	MOST PREFERRED	MOST PREFERRED	MOST PREFERRED
Fiscal Viability	MOST PREFERRED	MODERATELY PREFERRED	LEAST PREFERRED	LEAST PREFERRED	MODERATELY PREFERRED
SUMMARY	**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MODERATELY PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**

As shown in Table 5.9, Island Beach C is the most preferred alternative. Island Beach C and Headland Beach are the only two alternatives that were not ranked "least preferred" for any objectives. Island Beach C was ranked "moderately preferred" for the access and fiscal viability objectives. Island Beach C was ranked lower than Island Beach A for access since it has a greater potential encroachment on the existing sand beach at Marie Curtis Park. Refinements can be made to Island C to minimize this encroachment which would render Island C similar to Island A and Island B for the access objective. Island Beach C was ranked lower than Revetment for fiscal viability due to higher shore protection costs and waterlot acquisition.

Although there are higher expected costs with Island Beach C compared to Revetment, these are offset by higher rankings for naturalization, access and coordination objectives.

Overall, Headland Beach, Island Beach A and Island Beach B were ranked as moderately preferred. Island Beach A and Island Beach B were "most preferred" for more objectives than Headland Beach. The main differentiating factor between Island Beach A and B vs. Island Beach C was their scoring of "least preferred" under the fiscal viability objective. Although Headland Beach is not "least preferred" for any objective, it scores lower than Island Beach C under naturalization and coordination making it a less preferred alternative.

The Revetment alternative scored "least preferred" for naturalization, access and coordination objectives. Although Revetment is the lowest cost alternative, its inability to meet the other objectives make it "least preferred".

5.4 STEP 4 – CONFIRM, REFINE AND UNDERTAKE DETAILED ASSESSMENT OF PREFERRED ALTERNATIVE

Based on the evaluation described in Section 5.3, Island Beach C was selected as the LWC Preferred Alternative. A PIC was held on April 3, 2013 to present the selection of the LWC Preferred Alternative to the public. The primary purpose of this PIC was to confirm the selection of Island Beach C and determine if the public wanted to see any further refinements to Island Beach C prior to initiating the detailed effects assessment.

At the PIC, some members of the public indicated that they would prefer to maintain more of the existing sand beach at Marie Curtis Park. They indicated a desire to have the footprint for the Preferred Alternative scaled back along the beach so it does not extend to the mouth of Etobicoke Creek.

Utilizing this feedback from the public, the LWC Technical Team reviewed potential design options that would transition to the exiting beach at a point closer the WWTF. The solution was to include a small groyne structure at approximately the midpoint between Applewood Creek and Etobicoke Creek that would anchor the Preferred Alternative without extending east to Etobicoke Creek. This refinement to the Preferred Alternative is presented in detail in Chapter 6 and the detailed assessment of the Preferred Alternative is presented in Chapter 7.

6.0 DESCRIPTION OF THE LWC PROJECT PREFERRED ALTERNATIVE

This chapter describes the conceptual design of the LWC Project Preferred Alternative, construction techniques to build the LWC Project and a proposed phasing plan for construction. To ensure that the EA captures the greatest potential negative effects from the LWC Project, the LWC Project Preferred Alternative presented in this chapter, and the effects assessment presented in Chapter 7, is based on the upset limit of 2.0 million cubic metres of fill. A sensitivity analysis is included in Chapter 7 to assess any potential for increased negative effects at a smaller fill volume.

6.1 OVERVIEW OF THE CONCEPTUAL DESIGN

The conceptual design for the LWC Project includes the following components:

- Shoreline configuration and protection features;
- Naturalization; and
- Recreational features.

The various components are described in their built-out state in the following sections. Recommended habitat targets are described in Section 5.2.1. These recommended habitat targets reflect approximate dimensions (including area) that were developed during conceptual design and should be maintained (or enhanced) during functional and detailed design.

6.1.1 Shoreline Configuration and Protection Features

The LWC Project Preferred Alternative provides for up to 2.0 million cubic metres of fill. The shoreline protection features of the LWC conceptual design include armour stone revetment, cobble beaches, a groyne structure and offshore islands with two creek outlets (Serson and Applewood) incorporated into the footprint (Figure 6.1). The offshore islands are relatively low structures, designed for frequent overtopping to discourage access by both people and terrestrial flora and fauna, including cormorants, with their main coastal function being beach stabilization. The islands are expected to be separated from the shore under average lake levels.

The following subsections describe the conceptual details of these shoreline protection features based on a preliminary assessment of coastal conditions.

Figure 6.1 Overview of the LWC Project Preferred Alternative

6.1.1.1 Armour Stone Revetment

Armour stone revetments are a common type of shoreline protection feature on the Great Lakes. A revetment is a sloping structure consisting of an outer layer(s) of primary protection armour stone and sub layer(s) of secondary armour stone and rip rap. The slope of the revetment can vary, but 2h:1v is the most common and is the slope proposed for the LWC Project. This slope generally provides suitable stability for the underlying soil material and generally can be built with the reach of shore based equipment.

The lake bottom elevation in the area of the revetment drops as low as elevation 70.0 m and rises as high as 71.0 m. This means that under design high water levels, the depth at the revetment varies between 4.8 m and 5.8 m. Typical average summer water depth will vary between 4.0 m and 5.0 m.

The crest of the revetment will vary between approximately 80.5 m and 81.5 m. The primary layer of armour stone is anticipated to be set 1.0 to 1.5 m below the crest. These crest elevations are high enough to prevent wave overtopping but significant wave spray will be carried into the backshore and can be carried for a substantial distance. The toe of the revetment will be placed on a lakebed cleared of any loose sediment or soft material. The toe will likely consist of two or three stones placed horizontally on the lakebed in front (lakeward) of the revetment slope. The purpose of these horizontal stones is to protect the nearshore in the immediate vicinity of the slope and allow the front stones to potentially move if the nearshore is lowered without impacting the slope stone. The toe stones are likely to have sizable crevices between them, although the stones should be touching adjacent stones.

Structural aquatic habitat features will be incorporated along the toe of the revetment. The aquatic habitat features will need to resist relatively high currents during storms and large cobble or boulder size material would need to be used. Smaller material is expected to be unstable during major storms, however should establish a new form following these events.

The slope of the revetment will consist of a double layer of primary armour stone, a single layer of secondary armour stone and a rip rap layer. The double layer of primary armour stone is expected to be approximately 2.4 m to 2.6 m thick. The secondary armour stone and rip rap layers are each expected to be approximately 0.7 m thick each. Thus, on average, each armour stone will be 1.2 m to 1.3 m thick and is expected to be sized in the order of 4 to 8 tonnes.

The placement of armour stone will be "random"[14] since "special placement"[15] cannot be readily achieved in the depths of water found at this site. Random placement of armour stone can proceed at a faster pace than special placement thus reducing the cost per tonne placed, but the overall quantity of armourstone is larger. It is less susceptible to sudden failure than a single layer "special placement" revetment. The crevices between stones of a randomly placed revetment tend to be larger than between special placement revetment stones. This tends to reduce the wave uprush in comparison to special placement.

6.1.1.2 Cobble Beach

The eastern shoreline section of the LWC Preferred Alternative is a continuous cobble beach approximately 1,110 m long. The beach is fronted by three offshore islands (headlands) which are each approximately 150 m long. This means that approximately 650 m of the beach is exposed to direct wave action. The east end of the beach is anchored with an armour stone groyne located approximately 250 metres from Etobicoke Creek. This groyne structure was added to the design to minimize the extent of existing sand beach affected by the LWC Project. The west end of the existing beach will be anchored by a revetment headland from the most southerly extent of the land creation.

The majority of cobble beach slopes will have similar characteristics; however the most northern portion of the cobble beach shoreline (approximately one quarter of the beach length in the northern portion) will be slightly different as it represents the transition to the existing shoreline. The characteristics of the two different cobble beach sections are described separately below.

The southerly cobble beach (approximately three quarters of the beach length in the southern portion) will consist of cobble material ranging in size from 100 mm to 200 mm. This size of material would result in an above water slope in the order of 2.5h:1v and a below water slope of 6.0h:1v. The estimated crest of the beach under design wave conditions is 4.6 m above water level or approximately 80.4 masl if the 1:100 year water level is assumed.

The most northerly portion of the cobble beach shoreline (approximately one quarter of the beach length in the northern portion) between the groyne and the most northerly offshore island is a transition area that will accommodate smaller beach material, including both gravel and smaller cobble. This section of shoreline is subject to smaller waves than the southerly portions due to the shallower water and rising nearshore elevation which allows for the use of smaller

[14] "Random placement" means that each stone is placed individually and keyed in with adjacent stones so that it touches adjacent stones on at least three sides.

[15] "Special placement" refers to installation where each stone is individually placed and keyed very tightly against adjacent stones so that it touched adjacent stones on all four sides. Special placement is generally used on revetments with a single layer primary protection layer.

beach material. Gravel material from 10 mm to 100 mm would likely be used on this beach cell. The smaller material would be used in the north part of the beach adjacent to the groyne structure and coarser material would be introduced gradually towards the south end of this beach cell. The 50 m of beach west of the groyne will remain similar to the existing sand beach with sandy beach conditions dominating in summer calm weather conditions shifting to more gravel during winter storms. The smaller gravel material is expected to form a slope about 4h:1v slope above water and about 9.3h:1v below water. The crest of the beach is expected to reach an elevation of 78.3 masl. As the cobble size increases moving south (100 mm diameter), the cobble beach will transition to an above water slope of 2.3h:1v and 5.4h:1v below water. The crest of the beach is expected to rise to 78.8 masl. The underwater slope of the beach is expected to match gradually to the existing lake bottom and there will be no perceivable toe of slope for the new beach material in the northern portion of the shoreline. The area to the north of the groyne structure will remain sand.

The cobble beach is designed to be a dynamically stable structure. This means that there will be some movement of the beach material within defined limits. The beach and plan profile will adjust with each storm and change in water level. Beach materials undergo sorting according to grain size based on exposure to wave energy. The smaller size portion of the material appears to be more mobile and moves toward the semi-sheltered parts of the beach. The beach material will undergo attrition due to the constant movement which will lead to a very gradual reduction in size of the beach material. Further sorting and beach plan and slope adjustments will occur over time. The cobble beach will be predominantly free of hard features and obstructions that would influence the movement of the cobble beach material. One exception to this will be at the outlet of the Applewood Creek (see details in Section 6.1.1.4).

6.1.1.3 Offshore Islands (Headlands)

The offshore islands are “rocky outcrops” that influence the shape of, and provide stability to the cobble beaches. They will be constructed as land connected features with the temporary construction access connection removed upon completion.

The offshore islands are essentially long slender structures with revetments on both the exposed and sheltered sides and an armoured crest. They will be constructed with a relatively low crest that will allow some wave overtopping. The slope width of the crest and the crest elevation may vary to provide diversity and a more natural appearance. The crests of the islands are expected to be between 76.5 m and 77.5 masl and the crest width to be a minimum 10 m. Although the structure may be similar on both sides of the islands, wave conditions will be different providing different habitat functions and conditions. In addition, the proximity of the toe of the cobble beach to the toe of the islands will provide additional habitat structure for fish.

The revetment on the exposed side of the offshore islands will be similar to the standard revetment described in Section 6.1.1.1. The back side of the island will have similar protection above water and reduced armouring below low water level.

6.1.1.4 Creek Outlets

Two creek outlets will be provided along the shoreline. An outlet for Serson Creek will occur in the southern portion of the site and an outlet for Applewood Creek will occur in the northern portion of the site.

The Serson Creek channel will outlet through the revetment. The bed of the Serson Creek channel at the outlet is approximately 74.4 masl. Below this elevation the lower slope of the revetment will continue down at 2h:1v slope to the lake bottom. The bed of the creek is approximately 7.1 meters below the crest of the adjacent revetment on both sides. The revetment above the creek bed elevation will turn inland to protect the sides of the channel.

It is expected that waves will penetrate a substantial distance up the channel. The side slopes of the channel, both above and below water level, will slope at 2h:1v at the outlet and then gradually flatten to a more gentle slope further up the channel. The steeper side slope is recommended near the outlet to reduce the wave energy that is allowed to penetrate into the channel. The crest elevation of the side slope revetment can also gradually fall. It is expected that the channel will need to be lined with sufficient protection to withstand wave activity between 50 m and 75 m inland from the outlet. This distance will be refined during the detailed design. The protection works can reduce gradually in their mass as they move inland.

The landform inland from the outlet can be viewed as a valley with a small flow channel in the centre. The “valley” will be in the order of 35 m to 40 m wide at the outlet just behind the shoreline revetment.

The Applewood Creek outlet will be located in a cobble beach shoreline and is not subjected to direct wave action. The outlet is proposed to be positioned behind the southern portion of the most northerly island. It will be well sheltered from direct east quadrant waves and partly sheltered from southwest quadrant waves.

The bed of the Applewood Creek channel will be approximately 74.1 masl. This elevation is about ¼ of the way up the beach profile and will be submerged under most water level conditions. During typical summer conditions the outlet will have approximately 1 m of water and this will decrease to 0.5 m during the typical winter conditions.

The outlet of Applewood Creek will require some structural reinforcement to ensure that the outlet remains at the designed location over time. However, the structural reinforcement will be positioned well behind the location of the estimated beach profile so that under typical conditions the water will run through a cobble lined channel. Within the channel itself, the protection works will also need to extend inland for approximately 50 m to 75 m, similar to Serson Creek. This distance will be refined in the detailed design phase. Any reduction in the extent of the channel protection due to the beach material will be in part offset by deeper water in this channel, in comparison to Serson Creek.

It is expected that the cobble size in this part of the beach will be at the low end of the size range specified for the beach (see Section 6.1.1.2). The beach cobble is likely to continually form a bar across the mouth of the creek during storm events and the flow of the creek will need to break through these bars periodically during major rainfall evens. It is likely that under base flow conditions the creek will percolate through the cobble bar. This reduction in flow rate will lead to periodic flooding in the channel which will mimic natural coastal wetland behaviour.

6.1.1.5 Shoreline Protection Grading

The preliminary grades of the lakefill were initially set at 79.0 masl to establish approximate fill quantities. The ultimate site grades determined during detailed design will be based on a number of factors, such as provision for site drainage, landscape features, ecological functions and requirements of shore protection related to wave run up.

It is common practice to extend the crest of an armour stone revetment to the calculated wave uprush elevation. Based on this approach, the land elevation along the back of the revetment structure should be set at about an elevation of 80.5 to 81.5 masl.

Another common approach to site grading in the immediate vicinity of the revetment is to provide a cap stone that is set horizontally at the calculated wave uprush elevation. The fill behind the cap stone is then set 0.3 m to 0.6 m lower, thus the cap stones form a small barrier between the slope of the revetment and the backshore. Other variations of crest treatments can be considered during detailed design.

The elevation of the cobble beach crest is established by waves running up the slope of the beach. It is common on natural cobble beaches that the crest of the beach extends above the beach backshore elevation by about 0.3 m to 0.5 m after a major storm. The crest is then gradually knocked down by beach users until the next major storm. The estimated wave uprush in the southern three quarters of the cobble beach is in the order of 80.4 m. Therefore, the backshore grade in the beach area behind this section of cobble beach will be 79.9 to 80.1 m.

The most easterly section of cobble beach will have a lower crest due to smaller waves. The crest elevation is estimated to be 78.3 m at the north end and 78.8 m at the south end of this section. Following the same approach with the backshore being slightly lower than the calculated beach crest, the backshore could vary from approximately 77.8 m to 78.5 m from north to south.

6.1.2 Naturalization

Approximately 33 ha of naturalized habitat will be created as part of the refinement of the LWC Project Preferred Alternative, including approximately 7.5 ha of wetland habitat, approximately 3.5 ha of treed swamp, 5 ha of upland forest, 14.5 ha of meadow, 1.5 ha of beach and 1 ha of rocky island habitat. In all cases, maximum efforts will be made to use plant species that are phenotypically best suited to the Great Lakes/St. Lawrence Lowlands, including use of Carolinian species where appropriate, recognizing the fact that grassland habitats were historically limited to only a few locations in the City of Mississauga. Additional opportunities to create and improve aquatic habitat conditions within the Project Study Area will be discussed for the nearshore and pelagic zones. It should be noted that none of the natural environment features will increase flooding conditions.

6.1.2.1 Site Grading and Topography

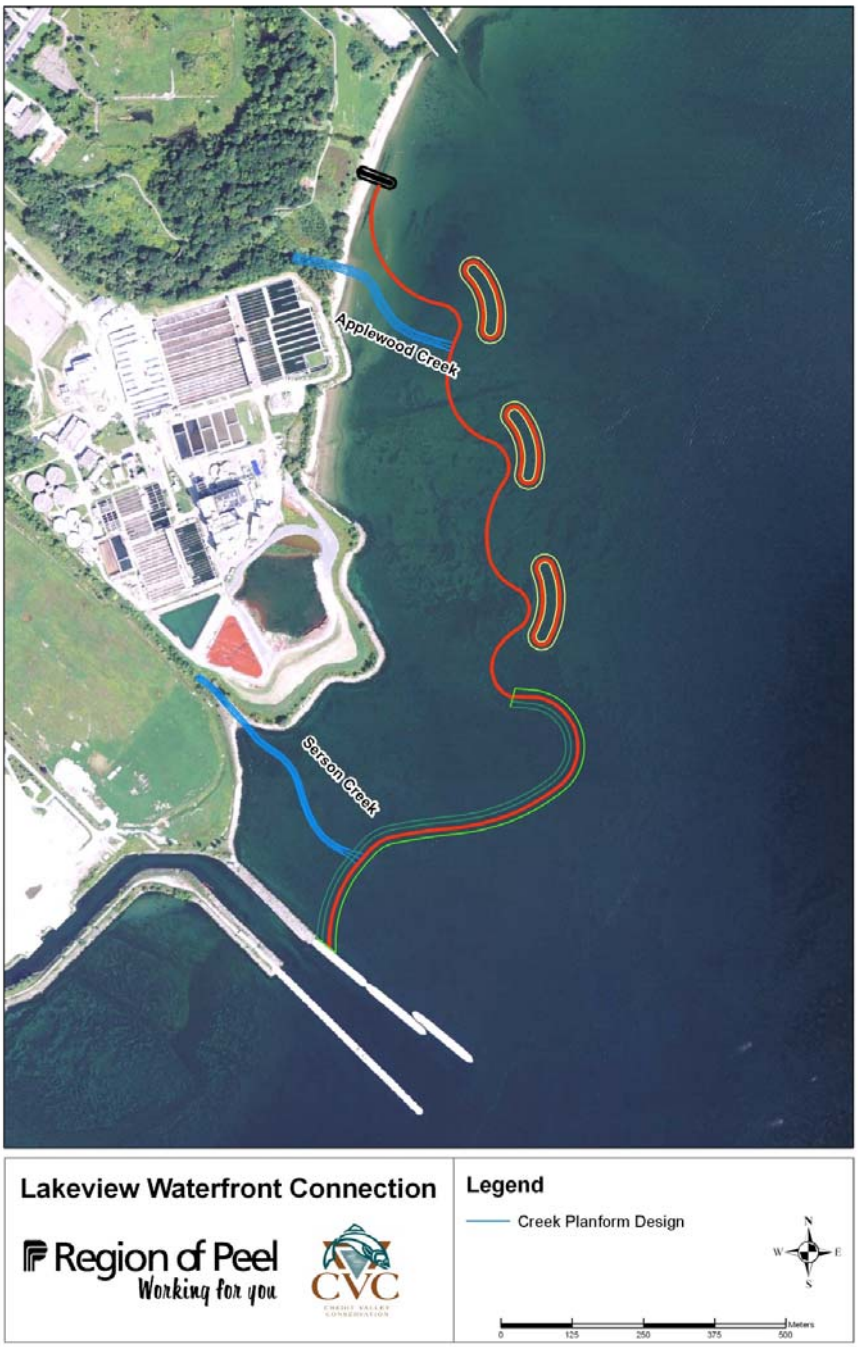
A conceptual grading plan for the LWC Project Preferred Alternative allows for an understanding of both the grading scenario and the landscape amenities that would be accommodated within the Project Study Area. To achieve the overall fill target for the LWC Project, the topography for the wetland and stream areas (cut) and upland areas (fill) must be clearly defined and balanced. In addition to considering the cut/fill balance for the site, defining the topography allows for advantageous (but approximate) placement of landscape features such as primary trails, stream crossings, lookouts, beach access points and connections. The conceptual grading and landscape plan is shown in Figure 6.1. Microhabitat variations in topography, drainage and other habitat structures will be addressed at the detailed design stage.

6.1.2.2 Serson and Applewood Creek

The main goal in designing the two channels was to adequately convey the 2-year flood to the Lake and provide additional capacity for the 5-year flood. The primary constraint in satisfying this goal is maintaining gradient through the channel designs. This is problematic because both creeks are relatively low gradient (0.60% and 0.30%) and extending them 200-300 m downstream would further reduce the gradient. Another consideration was accounting for variations in Lake Ontario surface elevation and ensuring that the creek would function at both high and low levels.

The creeks were designed to be relatively straight with slight sinuosity to preserve channel gradient throughout the length of the design (Figure 6.2). The smooth, gentle bends were also designed to avoid debris and ice-jams that may potentially occur within backwater zones near Lake Ontario.

Figure 6.2 Overview of Creek Planform Configurations



The creeks were designed to deal with the lake level fluctuations by including a slope break at the downstream end. This divides the profile into two segments (referred to as upper and lower segments). The bankfull elevation of the upper segment is tied into the high lake level elevation of 75.2 masl to contain the design discharge within the channel during high lake levels when backwatering is prominent. This results in slopes of 0.38% (Applewood) and 0.48% (Serson) for the upper segments (Figure 6.3 and 6.4). The lower segment is designed to convey flow to Lake Ontario during low lake levels tying in at 73.75 masl. The length of the segments is 35 m resulting in slopes of 1.0% (Applewood) and 1.8% (Serson). Based on the resultant gradient, the designs were tied in at different distances upstream - 315 m (Applewood) and 440 m (Serson).

Figure 6.3 Applewood Creek Conceptual Design Long Profile

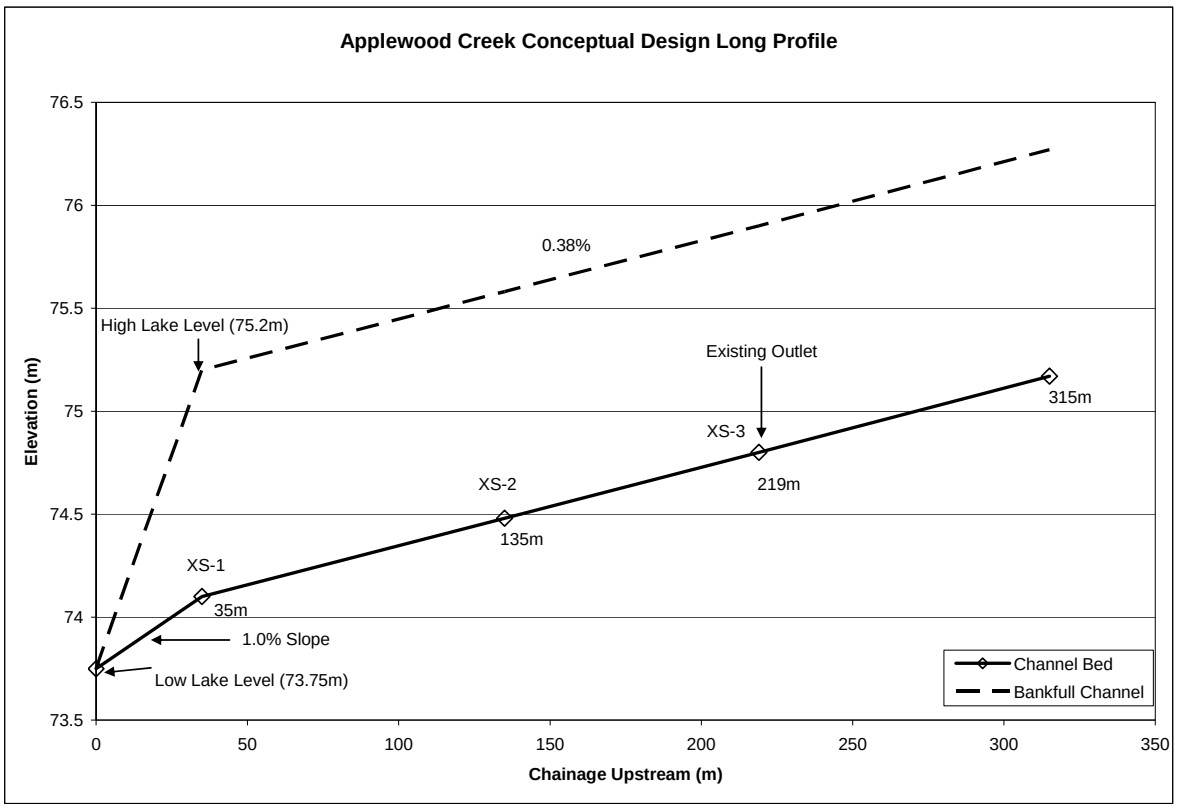
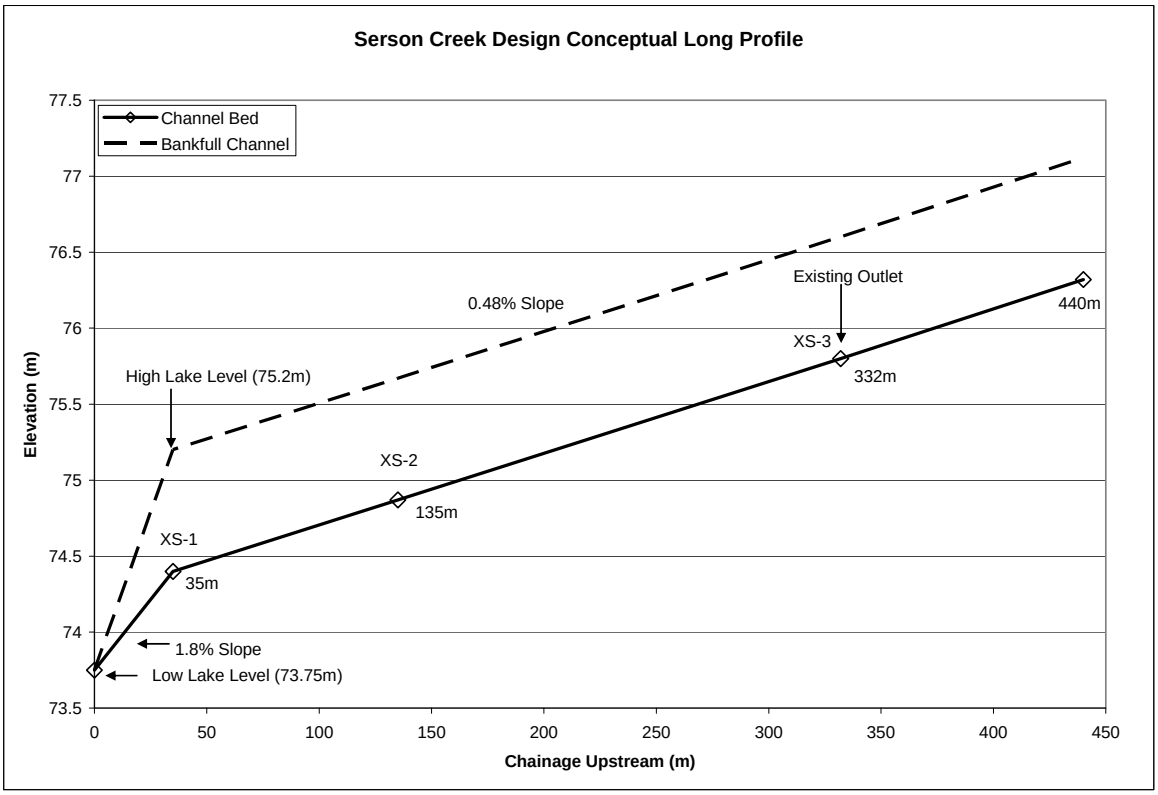


Figure 6.4 Serson Creek Conceptual Long Profile



Three conceptual cross sections were designed for each creek using the energy gradient and the 2-year flood discharges from the HEC-RAS model (Figure 6.5 and 6.6). The design discharge for Applewood was 9.6 m^3/s and 4.10 m^3/s for Serson. The cross section dimensions were then modeled in HEC-RAS to determine berm elevations which will contain the 5-year flood. Cross section XS-2 (Figures 6.5 and 6.6) was placed 100 m upstream of the bottom of the upper segment to be representative of a section within the wetland area of the waterfront design (Figures 6.7 and 6.8). The other two cross sections located at the upstream end of the design (XS-1) and the downstream end of the upper segment (XS-3) are the same dimensions as XS-2. They were placed in different locations to determine the berm elevations throughout the designs. This procedure was used for both creeks.

Downstream of XS-1 in the lower segment, the channels fan out 20 m and the top of bank and channel bed elevations pinch out at the monthly low lake level (Figures 6.9 and 6.10). It is expected that in this section, all flows will spill out as the banks taper. This was done to compensate for the steep gradient in this section.

Figure 6.5 Applewood Creek Planform with Design Cross-section Locations

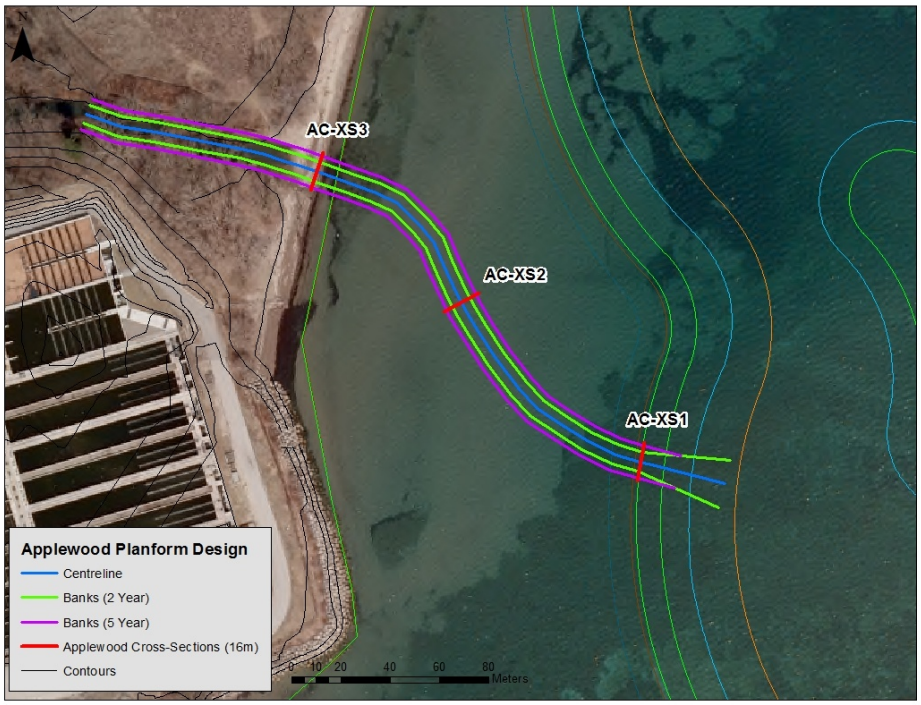


Figure 6.6 Serson Creek Planform with Design Cross-section Locations

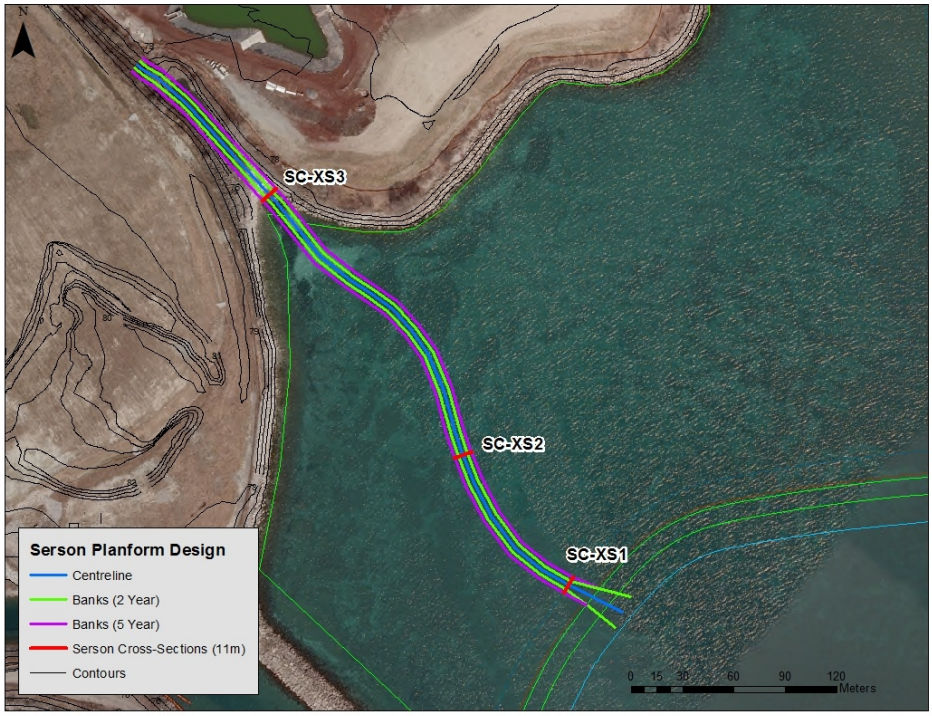


Figure 6.7 Proposed Applewood Creek XS2 (Total Section Width 16 m)

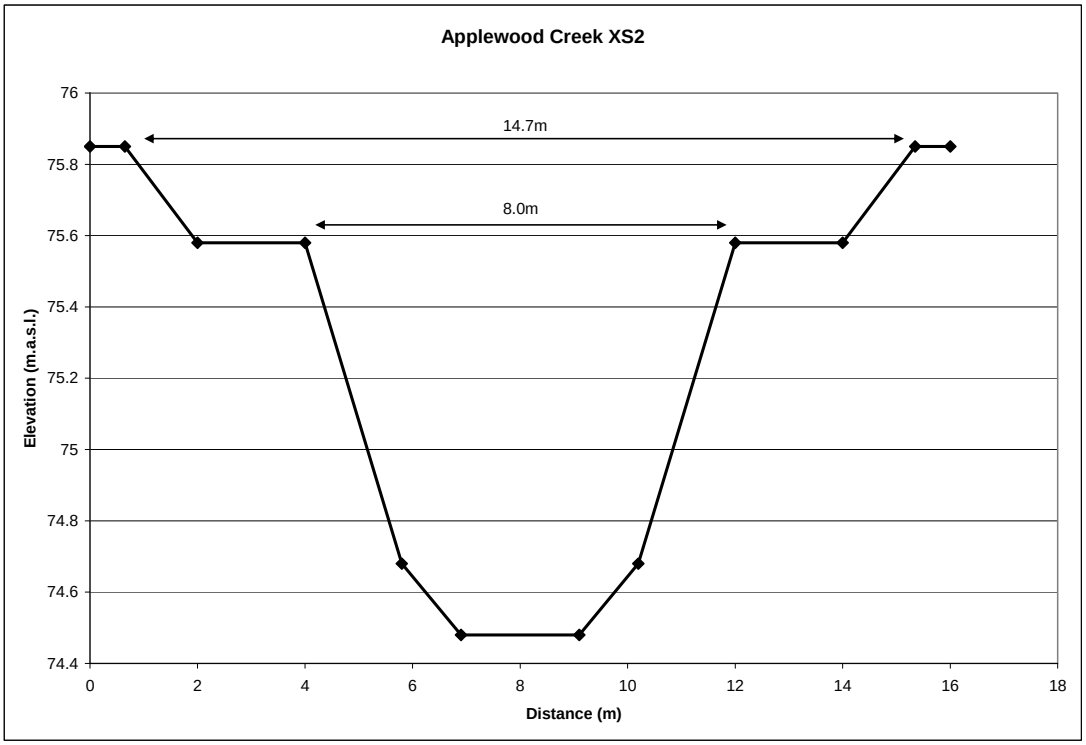


Figure 6.8 Proposed Serson Creek XS2 (total Section Width 11 m)

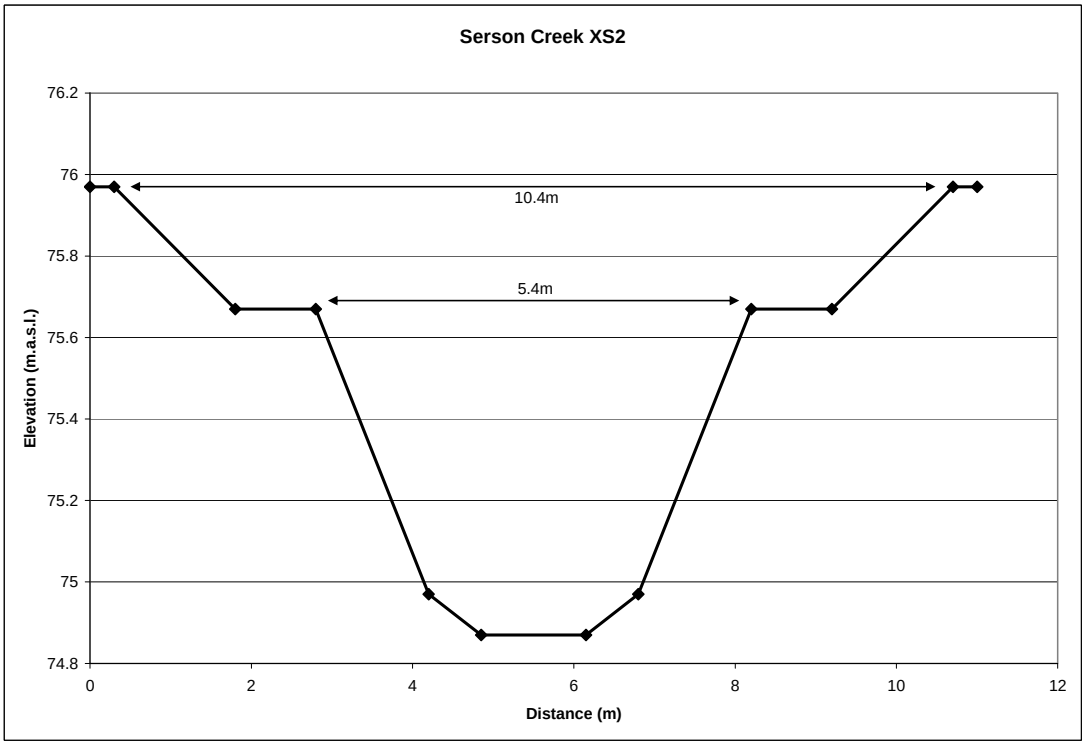


Figure 6.9 Proposed Applewood Creek Planform – Fan Section with Top of Bank Widths

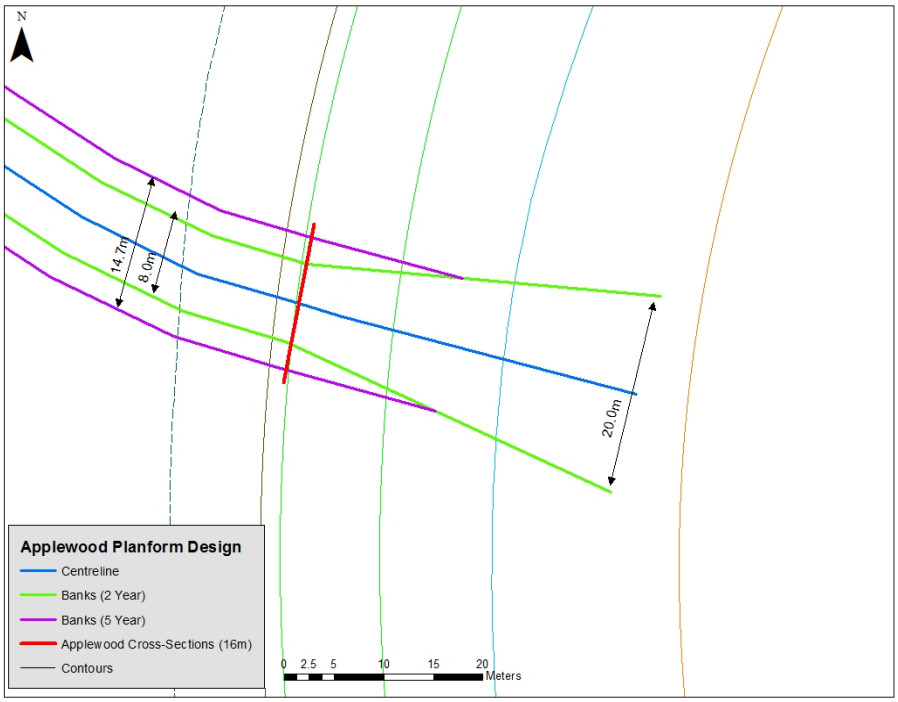
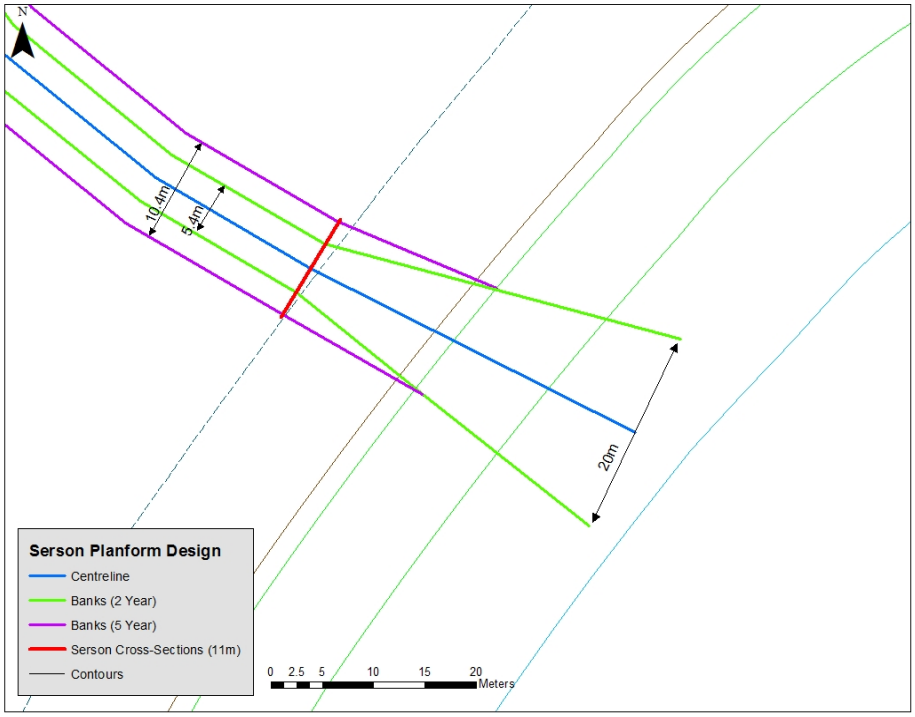


Figure 6.10 Proposed Serson Creek Planform – Fan Section with Top of Bank Widths



Serson Creek – Flow re-routing

In order to ensure that all flows reach Lake Ontario along the Serson Creek overflow channel, the current planform will need to be re-routed/graded away from the existing outlet. At the upstream end of the overflow channel, a flow diversion currently exists where low flows are directed through a small forest before being diverted into a culvert under the WWTF, and high flows (greater than bankfull) top the banks where they are diverted down the high flow channel that borders OPG's Lakeview site and Region of Peel land.

To achieve this, a berm will need to be constructed across the current low flow channel with elevations matching the existing top-of-bank. The channel will need to be gradually routed into the over flow channel, with a less abrupt meander bend geometry than currently exists (Figure 6.11). This channel construction will require some material to be removed along the north and east portions of the creek, for which banks will need to be re-graded (2:1 or 3:1) and stabilized by vegetation or rip rap, or a combination of hard and bio-engineered banks. Figure 6.11 provides the extent of the proposed re-routing of Serson Creek, with the proposed creek location, berm, and bank construction. The constructed bank will tie into existing top of bank locations upstream and downstream.

A minor tributary currently connects with Serson Creek downstream of the WWTF culvert. A plug will be used to either continue to direct flows from this tributary through the forest to the culvert under the WWTF; or divert flows alongside the western-edge of the forest to the Serson Creek overflow channel. The location of the plug, either upstream or downstream of the small tributary, will be explored during detailed design.

Figure 6.11 Conceptual Plan for Serson Creek Flow Re-routing

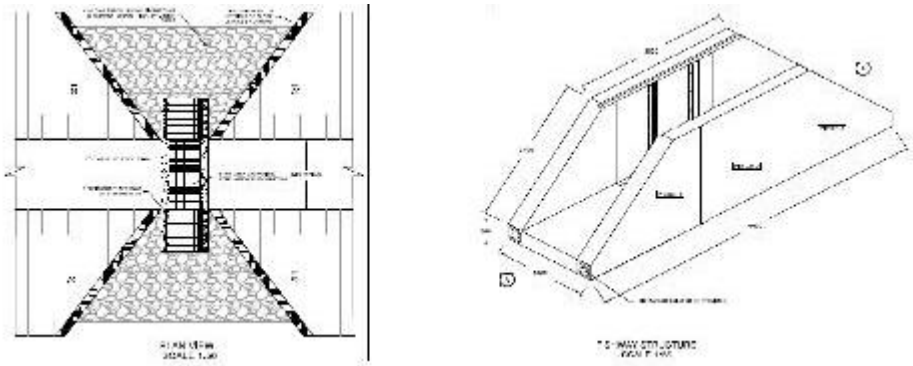
River-Levee Systems

A river-levee system will be used to direct flows from both Applewood Creek and Serson Creek to Lake Ontario. It is anticipated that a constructed levee will form the banks of the meandering channel for Serson Creek within the middle of the Serson Creek wetland complex (see Section 6.1.2.3 for wetland description).

For Applewood Creek, it is anticipated that only one channel bank will take the form of the constructed levee, with the other channel bank tied into the adjacent meadow landform feature. A large contiguous coastal wetland complex will be located to the south of the constructed levee for Applewood Creek (see Section 6.1.2.3 for wetland description). In both wetlands, small feeder channels (or sills) will be constructed through the levees at the downstream end of meanders to allow lake water to decant back into the wetland areas. During flood events in both creeks (greater than the 2 year event), flows from the creeks will overtop the constructed levees and enter the wetlands providing water, sediment and nutrients to the wetland systems. As water levels and the presence of carp (through their spawning and foraging behaviour) can greatly influence the establishment and long-term survival of wetland vegetation, water control structures (likely consisting of stoplogs and a metal grate) will be placed at the mouth of the

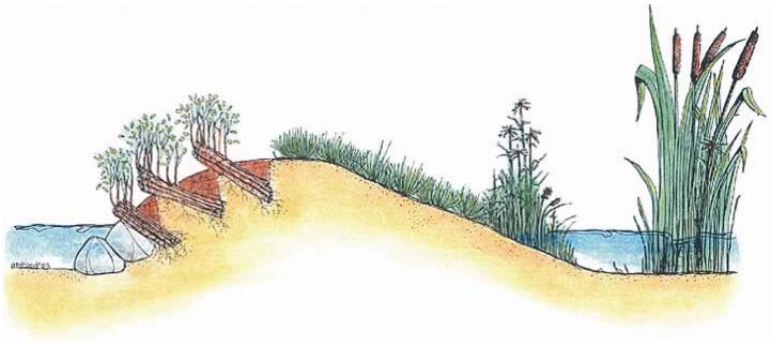
wetland feeder channels to manage water levels and exclude adult carp from entering the wetlands (Figure 6.12). Spaces within the water control structures can be either opened (either partially or fully) or closed to control fish access into the wetlands (e.g. while larger carp may not fit through the spaces, smaller fish may).

Figure 6.12 Example of Water and Carp Control Structure



The variation in topography provided by the levees along the creek channels will provide streambank habitat, supporting a diverse vegetation community, which includes riparian, emergent, and submergent vegetation (Figure 6.13). This streambank habitat increases the area of primary production and essential habitat for cool and cold water riverine and nearshore pelagic fish species, while improving foraging opportunities for both aquatic and terrestrial species.

Figure 6.13 Constructed Levees Separating Creek Channel Conditions (on the left) from Coastal Wetland Conditions (on the right)



In order to prevent debris blockages, and allow for levee overtopping into the wetlands during large flood events, the Serson Creek river-levee channel will outlet downstream of the wetland complex. As the river channel outlets directly to Lake Ontario, it will be designed to maintain a constant lake connection throughout the year. As such, the Serson Creek wetland complex will

be primarily regulated by both riverine and lake inputs. The channel will also provide estuary habitat (i.e., areas which represent a physical connection between the lake and riverine systems), providing more stable thermal conditions, and habitat for species that require access to both open water and riverine systems throughout their lifecycles.

As with the Serson Creek outlet, Applewood Creek will outlet to Lake Ontario downstream of the wetland in order to avoid debris blockages, and allow levee overtopping. Unlike the Serson Creek river-levee channel, the Applewood Creek river-levee channel will outlet through a cobble beach to Lake Ontario. While the Applewood Creek wetland complex may be opened to the Lake following wave overtopping of the beach or breaches caused by large flood events upstream, it is expected that the wetland will be more regulated by inputs from Applewood Creek. It is also noted that watershed-wide restoration efforts to be undertaken as part of LOISS will help improve watershed inputs and flow regime and attract more fish upstream from these newly created refuge areas in the estuaries.

6.1.2.3 Wetland Features

The primary function of the wetland complexes is to provide diverse aquatic habitat that supports a range of migratory and resident fish, waterfowl, herpetofauna and aquatic mammals. A total of 7.5 ha of coastal wetland habitat will be created as part of the LWC Project in the form of two river channels and wetland complexes located at the outlets of Serson Creek and Applewood Creek (see Section 5.2.4.1). The Serson Creek wetland complex is approximately 2.5 ha in size, and the Applewood Creek wetland complex is approximately 5.0 ha in size. While the total wetland habitat will be approximately 7.5 ha, the final size and orientation of the Serson Creek and Applewood Creek wetland complexes may be further refined during detailed design.

The wetlands will be designed to mimic coastal wetlands found along the north shore of Lake Ontario. The Serson Creek wetland complex will act as a drowned-river mouth and flooded delta wetland. A drowned river mouth and flooded delta wetland has direct surface-water connections, occupies flooded river valleys or cap drowned deltas, and is driven by both lake and riverine water inputs. The Applewood Creek wetland complex will act as a drowned-river mouth and protected wetland. A drowned river mouth and protected wetland has direct surface-water connections through the river-levee system and the wetland is protected behind a cobble beach, shielding the wetland from the direct hydraulic processes generated by Lake Ontario. These new wetlands will also provide connectivity between habitats along the north western Lake Ontario shoreline and attract biota from neighbouring wetlands.

The Applewood Creek wetland complex will extend south from the outlet of Applewood Creek to the outlet of the Serson Creek baseflow channel, and then south to Lake Ontario. The Serson Creek wetland complex will be located at the outlet of the Serson Creek stormwater channel, and extend directly towards Lake Ontario.

Wetland Depth and Vegetation

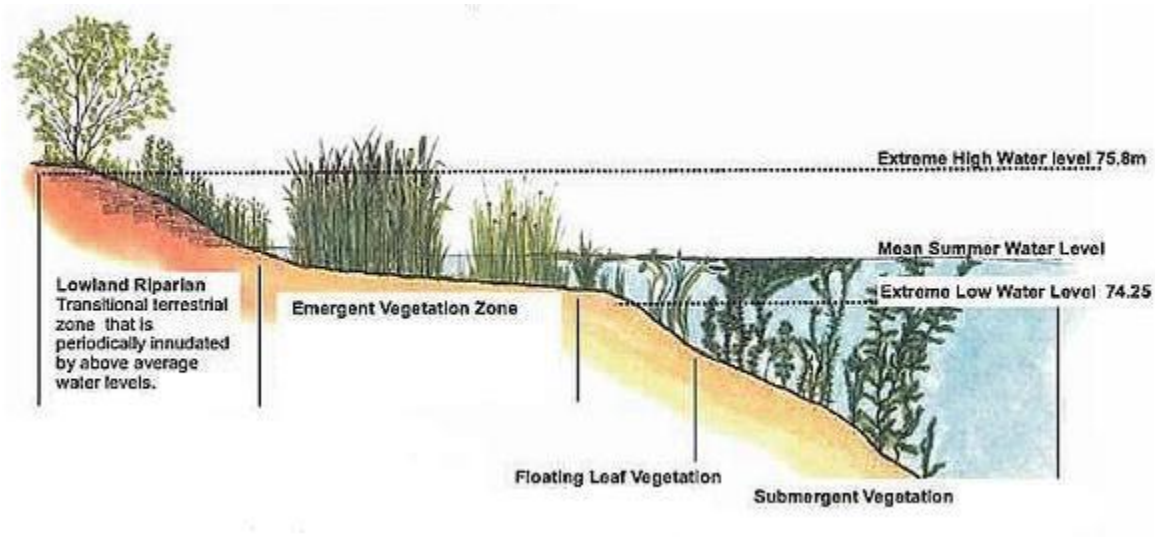
For the north shore of Lake Ontario, efficient primary production of coastal wetland plants occurs between 72.5 m and 75.0 masl. The type of vegetation that occurs within this range of elevation can be further refined as: lowland riparian vegetation (such as grasses, sedges and shrubs) occurs between 75.0 and 75.8 masl; the emergent vegetation zone (such as cattails) is restricted to elevations between 74.5 and 75.0 masl; and submergent vegetation is found at depths greater than 74.25 masl. As such, the wetlands within the LWC Project will have diverse bathymetry and microtopography, in order to provide for the establishment of various habitat communities and to provide sufficient diversity to allow the wetlands to adapt over a range lake levels in Lake Ontario. Table 6.1 provides a relative breakdown of the amount of wetland area available at each depth range. The functional wetland depth for the Serson Creek and Applewood Creek wetlands will be finalized during detailed design to optimize the diversity of habitat created. Figure 6.14 depicts the various habitat types based on wetland bathymetry.

Table 6.1 Relative Breakdown of Wetland Bathymetry for each Wetland

Target Depth Range	Applewood Creek (% depth)	Serson Creek (% depth)	Description of Habitat
Less than 72.5 masl	~ 25%	~10%	Produces open water and submergent habitat
72.5 to 75 masl	~ 25%	~ 45%	Produces submergent and emergent habitat, depending on seasonal lake levels
Greater than 75.0 masl	~ 50%	~ 45%	Produces emergent and low land riparian habitat

The variation in wetland vegetation communities will provide a range of habitat features. Wide vegetation stands of lowland riparian and emergent vegetation around the edges of the Serson Creek and Applewood Creek wetlands will provide a buffer from upland terrestrial habitats and provide opportunities for foraging, spawning, and nesting for waterfowl, herpetofauna, invertebrates, and aquatic mammals. Zones of submergent vegetation will be located near the feeder channels (in order to ensure these areas remain wet for longer periods), and will provide important habitat features for invertebrates, fish, and waterfowl, including shelter, feeding, and spawning habitat.

Figure 6.14 Wetland Vegetation Types Expected for Various Bathymetric Conditions



6.1.2.4 Terrestrial Features

Approximately 23 ha of naturalized terrestrial habitat is proposed in the conceptual design for the LWC Project. Terrestrial habitat features include treed swamp, upland forest and meadow habitat. The habitats described in this section are at a coarse community level. Site level details and specific habitats will be determined at the detailed design stage of LWC Project planning. These habitat types are recommended based on similar shoreline sites found along the north shore of Lake Ontario. Species will be chosen that are consistent with CVC's approved planting lists however, due to the unique location and climate along the lake, Carolinian species that would not otherwise be considered appropriate may be used. All vegetation to be installed will be approved by CVC and other applicable agencies. A detailed description of the desired habitat types are found below.

Treed Swamp

Approximately 3.5 ha of wet forest will be created between the WWTF, upland forest, and wetlands. Vernal pool features will be seasonally wet and will detain water in the spring or after larger rain events, periodically receiving water from high Lake Ontario levels during spring and early summer possibly receiving water during larger flood events in Serson and Applewood Creeks. Portions of the landform will be sloped to maximize overland drainage into the treed swamp. Runoff will be directed from the adjacent upland forest and meadow communities and will drain to the wetlands. The treed swamp will be located at elevations above the normal wetland and lake levels (75.4 masl - 75.8 masl) within an internally drained area.

The plant community within the treed swamp could consist of softwood species such as cottonwoods, willows and silver maple. Other shrub, tree and herbaceous species appropriate to seasonally wet habitat such as Red Osier Dogwood, Boneset, Blue Vervain, and Spotted Jewel Weed could also be included within this community.

The treed swamp will also connect the Applewood and Serson Creek wetland complexes for increased habitat and connectivity functions and act as a visual barrier to the WWTF.

Upland Forest

Approximately 5 ha of upland forest will be created as part of the LWC Project. The upland forest will be located adjacent to the treed swamp community forming a continuous large forest block adjacent to the meadow and wetland communities. Portions of the landform will be sloped to drain towards the treed swamp and will be located at elevations above the treed swamp and normal water levels of the wetlands and lake.

The upland forest plant community could include native Carolinian species that are appropriate for the site such as oak species, hickory species, Wood Anemone, Maple Leaf Viburnum and Witch Hazel. Pioneering softwood species such as cottonwoods, willows and poplars could also be included.

Meadow Habitat

Approximately 14.5 ha of meadow habitat will be created as part of the LWC Project. This plant community will be located along the shoreline between the shoreline treatments (beach/ revetment), forest and wetlands. Some of this landform should be sloped to drain towards the wetlands and the rest towards the lake to provide an appropriate water to land transition and sight lines desired by the public.

The meadow habitat will be designed to provide a number of habitat functions including, but not limited to, habitat elements for mammals, herpetofauna, migratory bird and butterflies and breeding birds. The community will consist largely of meadow species intermingled with nectar producing flowers, fruits and seeds. Carolinian species appropriate to the site will also be incorporated. Some characteristic species could include: Heath Aster, New England Aster, Canada Golden Rod, Staghorn Sumac, St. Johns Wort, Virginia Wildrye, milkweeds and Black Eyed Susan.

This habitat will serve as important migratory rest and launching habitat for birds and butterflies flying over the lake. The largely un-treed area would also serve as potential breeding and raptor prey habitat.

6.1.2.5 Aquatic Habitat

The LWC Project Preferred Alternative results in the creation of approximately 1,110 m of new beach including 795 m of cobble (median grain size of 15 cm), 295 m of cobble/gravel (median grain size of 5 cm) and 50 m of sand/gravel (grain size ranging from 1 to 5 cm with finer material dominating in the summer), 485 m of lee island shoreline, and 1,285 m of revetment. Creation of cobble beaches will help maintain biodiversity in the Great Lakes since they are considered globally rare. (United States Environmental Protection Agency & Environment Canada, 2009). Beaches are highly productive for pelagic forage fish that support and feed the economically important pelagic salmonids and other top predators. The new open coast shoreline will provide excellent forage, spawning and nursery habitat conditions and the lee side islands habitat will provide sheltered habitat for Lake Ontario species. Important feeder fish species such as Emerald Shiner, Lake Chub and Spottail Shiner will be provided habitat. This will provide an excellent foundation for a healthier and broader fisheries community.

The islands provide sheltered habitat between the shoreline and the islands, providing refuge from coastal processes. The leeward side of the islands provides high quality cool and cold water fish habitat for spawning and foraging, which will be augmented through areas surcharged with point shoal and rock piles.

Structural aquatic habitat features will be incorporated along the toe of the revetment, as noted in Section 6.1.1, in order to improve relatively poor habitat along the open coast. The habitat features would provide shelter and additional habitat elements for fish along the harsh open coast.

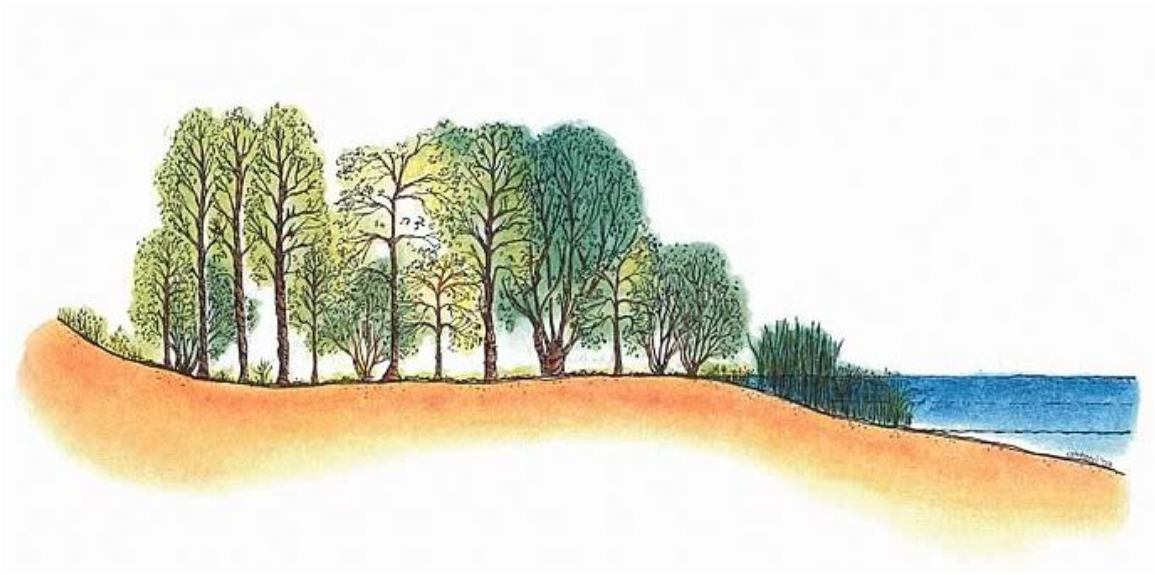
6.1.2.6 Serson Creek Stormwater Channel Habitat Enhancement

The current configuration of the Serson Creek stormwater channel consists of approximately 680 m of straightened stream length offering limited functional habitat for fish and wildlife. This channel accepts water during precipitation events and as a result may remain dry during certain periods of the year and thereby provides poor quality fish habitat. In addition, the channel is lined with boulder and rip-rap sized substrates which may result in a barrier to fish migration in low flow conditions. The LWC Project Preferred Alternative seeks to incorporate baseflow into the overflow channel. With the addition of baseflow inputs, the capacity for functional habitat is expected to increase considerably.

The primary function of habitat enhancements to the stormwater channel is to facilitate the movement of fish and invertebrates by creating transitional habitat elements between the lower reach of Serson Creek and the newly created wetland complex. A primary component of this

enhancement is the creation of riparian planting nodes as shown in Figure 6.15. These nodes will act to provide a forage base for fish and invertebrates as well as provide structural habitat for resting and refuge. In addition, riparian plantings aid in the stabilization of stream banks and mitigate soil erosion caused by flowing water. Supplementary streambed habitat may be provided through the select placement of boulders, rock and secured large woody material in areas that require structural augmentation to provide refuge and feeding areas for fish and invertebrates. It is of critical importance that the habitat features proposed above, do not impede the capacity of the channel to efficiently convey storm water discharges to Lake Ontario.

Figure 6.15 Example of Riparian Planting Node Cross-Section



6.1.3 Recreational Spaces

In addition to the naturalization components described in Section 6.1.2, the conceptual design identifies primary trails throughout the naturalized area that are intended to accommodate passive recreational uses. Secondary and tertiary trails will be considered during detailed design. Although not part of the EA for approval purposes, such uses include walking, cycling, in-line skating, birding, fishing, accessing the water's edge, nature appreciation, cultural interpretation, spiritual expression, and retreat from urban life.

Recreational trails will be developed using appropriate materials and construction techniques in order to minimize effects on water quality. In addition, they will be developed to ensure the safety of park users and the sustainability of the vegetation communities. There are no active recreational facilities proposed within the LWC Project footprint.

There will be a primary trail system that generally follows the newly constructed shoreline. The trail system will meet the appropriate Trail Guidelines for the City of Mississauga, Waterfront Trail and Credit Valley Conservation. . It will be a major connecting link between the existing waterfront trail at Marie Curtis Park in the east and future trail connections west of the WWTF. The general trail configuration is illustrated on Figure 6.1. The path will be cited above the lake and river 10 year flood level to minimize flooding, damages and maintenance costs for the trail. Where crossings of the two wetland areas must occur, this may take advantage of raised trails and boardwalk strategies to provide the protection needed and minimize the length of bridge spans required.

6.2 MAINTENANCE ASSOCIATED WITH THE LWC PROJECT PREFERRED ALTERNATIVE

The LWC Project Preferred Alternative will require on-going maintenance activities associated with a number of the design components. These include maintenance of sediment, debris and ice management features, naturalized areas (including terrestrial, wetland and aquatic habitat), flood protection and recreational features. A description of the maintenance activities associated with each of the design components of the LWC Project Preferred Alternative is provided below.

Shoreline Protection

- Inspection and maintenance of shoreline protection features to ensure that their function is maintained.
- Periodic site reviews should be carried out in accordance with Public Works Canada and Transport Canada, 1985. Guidelines for Inspection and Maintenance of Marine Facilities.

Sediment and Debris

- Removal of debris along streams and river outlets if deemed a hazard to flood conveyance.
- Continued debris removal for sandier portions (first 50 m or so) as currently done at MCP.

Naturalization

- Removal of invasive and undesired plant & animal species from naturalized areas, as deemed necessary.
- Removal of invasive fish species and plants from the lake-connected wetlands if deemed to be negatively affecting the local vegetation communities.

- Removal of debris from wetlands and the low flow channel within Serson and Applewood Creeks following flood and rainfall events, as deemed necessary.
- Maintenance of constructed levee and wetlands systems will be required to ensure wetland function. Water control and carp exclusion structures associated with wetland feeder channels will require ongoing maintenance and monitoring.
- Periodic mowing, burning or manual removal of woody species in order to maintain meadow.
- AEM including monitoring of ecological elements may dictate additional actions required to sustain the intended ecological communities.

Recreational Trails

- Trail maintenance would be conducted on a regular and "as required" basis, in accordance with CVC conservation land management policies.
- Informal trails will be monitored and decommissioned as needed to ensure public health and safety and to minimize ecological impacts on the communities.

6.3 CONSTRUCTION ACCESS ROUTES

At present, there is no vehicular access to the construction area; as such, a new, temporary access route is required. The access route will allow trucks carrying fill and other required materials to reach the construction site. A 7 to 10 year construction period is anticipated for the placement of fill so the access route would be in place for 7 to 10 years to complete the LWC Project (although it could be longer depending on construction timelines). The construction planning team anticipates a maximum of 250 truck deliveries per day with a more typical volume being 200 trucks per day. Once construction is complete the route will be decommissioned, removed and restored.

Alternative routes were identified to the east of the LWC Project Study Area. Construction access through the OPG lands is not available at this time. Furthermore, access is unavailable through the WWTF site due to the constrained nature of the site and associated site operations.

6.3.1 Alternative Site Access Routes

The alternative site access routes were developed by looking at logical historic and existing access points along Lakeshore Road. Three potential access points were identified (Figure 6.16):

1. The existing eastern access to the WWTF;

2. The intersection of Lakeshore and Dixie (southside of Lakeshore) or the former entrance to the Small Arms Building in the Arsenal Lands; and
3. 1400 Lakeshore Road which is a former driveway on the southside of Lakeshore and is part of the Arsenal Lands.

The existing entrance and access road to Marie Curtis Park was not considered for the following reasons:

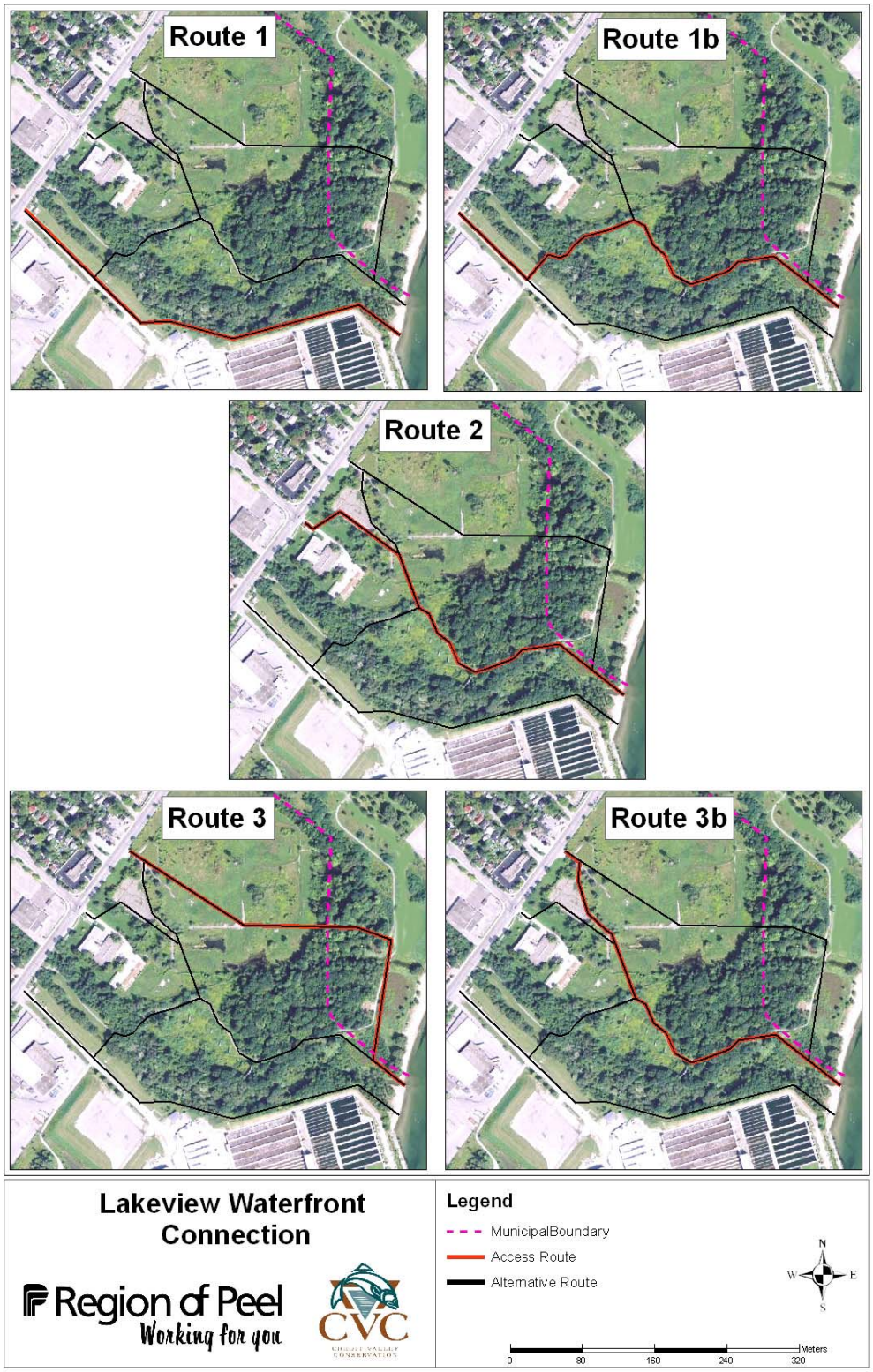
- The west bank of Etobicoke Creek, underlying most of the access road, is a former municipal landfill with very little overlying topsoil. Costs would be significant to re-grade and reconstruct the access road to withstand anticipated truck traffic.
- Marie Curtis Park will have just completed (Spring 2013) extensive park enhancements on the west side of Etobicoke Creek, paid for by the City of Toronto. These park enhancements are extremely popular to the local community in Toronto and Mississauga. The public would not support being excluded from the park for several years immediately after these enhancements have been completed.

The end point for the potential access points is one of two locations on the beach to the east of the WWTF. These end points provide access to the northern extent of the land creation area. Between the access points and the end point there are a number of constraints that could result in effects to environmental, social and cultural resources. These constraints include:

- The waterfront trail;
- Heritage resources such as the former shooting range and small arms buildings;
- Soil contamination;
- Natural features such as woodlots, Species at Risk (Butternut trees) and Applewood Creek;
- Sections of Marie Curtis Park which are a former municipal landfill site;
- Potential for archaeological resources to be unearthed;
- Potential traffic impacts to Lakeshore Road; and
- Enhancements planned and underway for the existing local parks.

Five alternative routes were developed between the alternative access points and end point. Each route crosses or affects some or all of the constraints listed above. Figure 6.16 illustrates the alternative access routes. It is assumed that all routes will include a 12 m wide road bed, allowing 2 way traffic and that the road beds will be built to high quality standards to minimize maintenance due to wear and tear by the anticipated truck volumes.

Figure 6.16 Alternative Site Access Routes



6.3.2 Construction, Operation and Decommissioning of Construction Access Routes

The following bullets describe the construction process for establishing the access route and mitigation measures that would reduce negative effects:

- Develop tree removal (include plant salvage and relocation) and compensation/restoration plan.
- Obtain all relevant Municipal and/or Regional occupancy permits.
- Conduct locates for all buried utilities.
- Arrange for curb cutting if required.
- Install construction signage as required – i.e. Caution trucks turning.
- Undertake grubbing and clearing as required.
- Install tree protection measures as required.
- Install sediment control fencing around the perimeter of the laydown area including site trailer and parking area.
- Install sediment control fencing along the length of the haul road where runoff could potentially enter watercourses.
- Remove asphalt cover (Waterfront Trail) and dispose off-site at an approved recycling facility.
- Strip granular base from Waterfront Trail (below asphalt) and re-use as final cover for haul road (above the brick rubble).
- Strip topsoil as required from proposed haul road and laydown area. Stockpile adjacent to haul road for re-use / restoration upon project completion.
- Import and place ¾ inch crusher run for laydown (assume 200 mm). Laydown would be located within the road footprint to allow placement of a construction trailer and port-o-potties. The majority of laydown will occur within the LWC Project footprint as fill is placed.
- Install mudmat as per municipal or regional specifications – typically 10 m by 60 m using 2 inch clear stone.
- Import and place brick rubble along length of proposed haul road – (minimum 300 mm to 750 mm) or as required for stable long term haul road. Road width will be approximately 9 m within a 12 m ROW.
- Topdressing for haul road will be imported purchased aggregate – ¾ inch crusher run (assume depth of 150 mm). Compaction if required.
- Maintenance will include grading, importing and placing additional brick rubble and purchased aggregate as required.
- Mitigation measures will include water application as dust suppressant. Calcium chloride will be considered as an alternative if required.
- Mud tracking onto municipal or regional roads will be mitigated via street sweeper.

- Establish a communication strategy and protocol for managing communications between cities, agencies, and the public throughout construction.
- Coordination with City of Toronto for construction signage and advanced notification as needed.
- Coordination with TRCA and City of Toronto for tree removals and restoration as required.

All areas of the site disturbed by the haul road will be restored to original conditions upon completion of LWC Project. This will include removal and off-site disposal of imported materials that cannot be reused, re-construction of the Waterfront Trail, landscaping, tree planting, seeding, etc.

6.3.3 Evaluation of Alternative Site Access Routes

The evaluation of the alternative site access routes has been structured around environmental, social, cultural, technical and cost components and seeks to identify the site access route which minimizes effects to each component. Similar to the evaluation of Alternative Methods presented in Chapter 5, the evaluation is framed around criteria and indicators that measure the relative effects of each alternative on each component. The evaluation of alternative site access routes follows the same methods described for the evaluation of Alternative Methods.

Based on a review of available baseline information and information presented in Section 6.3.2, a comparative evaluation and assessment of environmental effects has been carried out for each alternative site access route. Table 6.2 presents a summary of the comparative evaluation and effects assessment for each route based on the identified criteria and indicators. The mitigation measures as well as basic best management practices for construction (e.g. safe fuel handling) listed above have been assumed in the assessment of effects such that the information presented in the table represents net environmental effects. A detailed evaluation table including the rationale for each criterion and indicator is provided in Appendix D.

Table 6.2 Alternative Construction Site Access Route Evaluation

Environmental Component	Criteria	Indicator	Alternative Route				
			Route 1	Route 1B	Route 2	Route 3	Route 3B
Natural Environment	Vegetation/habitat removed or disturbed during construction of site access road and laydown area	Area and significance of vegetation removed	• largest amount of vegetated habitat removal • habitat removed includes communities of higher conservation concern **Least Preferred**	• removal of ~25 mature trees • habitat removed includes communities of lower conservation concern **Moderately Preferred**	• limited vegetation removal • habitat removed includes communities of lower conservation concern **Most Preferred**	• limited vegetation removal • habitat removed includes communities of higher conservation concern **Moderately Preferred**	• limited vegetation removal • habitat removed includes communities of lower conservation concern **Most Preferred**
		Potential for forest habitat fragmentation	• largest amount of tree removal • largest potential for fragmentation • additional interior trees require removal to realign the Applewood Creek channel **Least Preferred**	• removal of ~25 mature trees • limited increase in fragmentation **Moderately Preferred**	• removal of only a few trees • no increase in fragmentation **Most Preferred**	• limited tree removal • road bisects centre of woodlot causing fragmentation • potential for tree mortality if roots are damaged **Least Preferred**	• removal of only a few trees • no increase in fragmentation **Most Preferred**
	Disruption to Applewood or Serson Creek	Length and nature of disruption to waterbodies (including Applewood, Serson and Etobicoke Creeks, and wetlands)	• highest potential for changes to fish habitat, water quality and riparian vegetation due to realignment of stream channel habitat (200 m) **Least Preferred**	• moderate potential for changes to fish habitat, water quality and riparian vegetation due to temporary road crossing over Applewood Creek **Moderately Preferred**	• no waterbody disruption **Most Preferred**	• no waterbody disruption **Most Preferred**	• no waterbody disruption **Most Preferred**
		Potential to impair water quality in Arsenal Lands wetland areas.	• no Arsenal Lands wetland areas affected **Most Preferred**	• no Arsenal Lands wetland areas affected **Most Preferred**	• ~50 m from amphibian breeding pond • potential water quality degradation due to erosion, siltation and other contaminants **Moderately Preferred**	• ~25 m from amphibian breeding grounds • ~ 50 m from marsh area • potential for water quality to be degraded due to erosion, siltation and other contaminants **Least Preferred**	• ~50 m from amphibian breeding pond • potential water quality degradation due to erosion, siltation and other contaminants **Moderately Preferred**
	Disruption related to natural hazards (floodplain, erosion)	Nature of change to flood capacity and exposure to natural hazards	• greatest risk due to erosion potential from Applewood Creek valley slopes **Least Preferred**	• temporary bridge crossing has potential to restrict Applewood Creek flows upstream **Moderately Preferred**	• not located near hazard areas **Most Preferred**	• crosses small ephemeral stream to the east of Applewood Creek **Moderately Preferred**	• not located near hazard areas **Most Preferred**

Table 6.2 Alternative Construction Site Access Route Evaluation (Cont'd)

Environmental Component	Criteria	Indicator	Alternative Route				
			Route 1	**Route 1B**	**Route 2**	**Route 3**	**Route 3B**
SUMMARY			**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**	**LEAST PREFERRED**	**MOST PREFERRED**
Social Environment	Disruption to use and enjoyment of Waterfront Trail	Length of trail disrupted	• one trail crossing near Lakeshore • will not likely require flagging for user safety **Most Preferred**	• requires closure of the trail through the Arsenal lands • requires dead-ending of the trail within Marie Curtis Park • temporary trail will be constructed along the south side of Lakeshore during construction • will not likely require flagging at the one point of crossing for user safety **Least Preferred**	• requires closure of the trail through the Arsenal lands • requires dead-ending of the trail within Marie Curtis Park • temporary trail will be constructed along the south side of Lakeshore during construction • will not likely require flagging at the one point of crossing for user safety **Least Preferred**	• one trail crossing near beach volleyball courts in Marie Curtis Park • will require flagging for user safety **Moderately Preferred**	• requires closure of the trail through the Arsenal lands • requires dead-ending of the trail within Marie Curtis Park • temporary trail will be constructed along the south side of Lakeshore during construction • will not likely require flagging at the one point of crossing for user safety **Least Preferred**
	Disruption to use and enjoyment of Marie Curtis Park	Area of Marie Curtis Park disrupted	• no disruption **Most Preferred**	• no disruption **Most Preferred**	• no disruption **Most Preferred**	• disruption to woodlot south of Arsenal Lands and southwestern most parts of Marie Curtis Park, possibly including the beach volleyball courts **Least Preferred**	• no disruption **Most Preferred**
	Disruption to redevelopment of Arsenal Lands and Marie Curtis Park	Nature of disruption to redevelopment activities	• no disruption **Most Preferred**	• impacts limited to trails adjacent to rifle baffles **Moderately Preferred**	• impacts limited to the Small Arms Building area and trails adjacent to rifle baffles **Moderately Preferred**	• impacts Arsenal Lands as route occupies majority of site • prevents Marie Curtis Park reforestation works in 2013 **Least Preferred**	• impacts Arsenal Lands as route occupies majority of site **Least Preferred**
	Potential to disrupt traffic on Lakeshore Boulevard	Potential for truck traffic to affect the flow of traffic on Lakeshore Boulevard	• may require a new temporary signal light off of Lakeshore causing some traffic disruption • trucks delivering fill from Hanlan water main site will need to enter back onto Lakeshore to access route **Least Preferred**	• may require a new temporary signal light off of Lakeshore causing some traffic disruption • trucks delivering fill from Hanlan water main site will need to enter back onto Lakeshore to access route **Least Preferred**	• existing \signal light at Lakeshore so no new disruption • shared access with Hanlan water main site removes some trucks from Lakeshore. **Most Preferred**	• may require a new temporary signal light off of Lakeshore causing some traffic disruption • trucks delivering fill from Hanlan water main site will need to enter back onto Lakeshore to access route **Least Preferred**	• may require a new temporary signal light off of Lakeshore causing some traffic disruption • trucks delivering fill from Hanlan water main site will need to enter back onto Lakeshore to access route **Least Preferred**
SUMMARY			**MOST PREFERRED**	**LEAST PREFERRED**	**MOST PREFERRED**	**LEAST PREFERRED**	**LEAST PREFERRED**
Cultural Environment	Proximity to heritage features	Distance between road and heritage features	• nearest feature is ~70m **Most Preferred**	• nearest feature is ~5m **Least Preferred**	• nearest feature is ~5m **Least Preferred**	• nearest feature is ~115m **Most Preferred**	• nearest feature is ~5m **Least Preferred**
	Potential for Archaeology Resources	Potential for unearthing archaeological resources as part of access road construction.	• some potential triggering Stage 2 archaeological assessments (~475 m) **Moderately Preferred**	• some potential triggering Stage 2 archaeological assessments (~1120 m) **Least Preferred**	• some potential triggering Stage 2 archaeological assessments (~1185 m) **Least Preferred**	• some potential triggering Stage 2 archaeological assessments (~140 m) **Most Preferred**	• some potential triggering Stage 2 archaeological assessments (~1260 m) **Least Preferred**
SUMMARY			**MOST PREFERRED**	**LEAST PREFERRED**	**LEAST PREFERRED**	**MOST PREFERRED**	**LEAST PREFERRED**

Table 6.2 Alternative Construction Site Access Route Evaluation (Cont'd)

Environmental Component	Criteria	Indicator	Alternative Route				
			Route 1	**Route 1B**	**Route 2**	**Route 3**	**Route 3B**
Technical/Engineering	Ease of construction	Issues which will complicate construction	• significant tree removal required • narrow work area with steep slopes bordered by a watercourse • requires relocation of the watercourse, and stabilization of the valley wall **Least Preferred**	• bridge required to cross stream • ~25 full mature trees removed • longest section of road to create • new trail along Lakeshore required for construction period **Least Preferred**	• 1 or 2 mature trees removed • moderate length of Waterfront Trail will be destroyed • new trail along Lakeshore required for construction period **Moderately Preferred**	• relocation of 2 young butternuts and removal of 1 mature tree • root protection in forest required • short section of Waterfront Trail will be destroyed. **Most Preferred**	• 1 or 2 mature trees removed • moderate length of Waterfront Trail will be destroyed • new trail along Lakeshore required for construction period **Moderately Preferred**
	Ease of decommissioning	List of issues which will complicate decommissioning	• Longest section of floodplain and forest to restore following road decommissioning **Least Preferred**	• Longest section of Waterfront Trail to restore following road decommissioning **Least Preferred**	• Moderate length of waterfront trail to restore following road decommissioning **Moderately Preferred**	• Least complex decommissioning and restoration **Most Preferred**	• Moderate length of waterfront trail to restore following road decommissioning **Moderately Preferred**
	Potential to disturb contaminated soils	Area of contaminated soils crossed	• potential for contamination from spent bullets - some testing required **Most Preferred**	• potential for contamination from spent bullets - some testing required **Most Preferred**	• potential for contamination from spent bullets - some testing required **Most Preferred**	• portions overlie an old municipal landfill where additional protective measures may be required to prevent disturbance of the underlying soils. **Least Preferred**	• potential for contamination from spent bullets - some testing required **Most Preferred**
SUMMARY			**LEAST PREFERRED**	**LEAST PREFERRED**	**MOST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**
Cost	Cost of construction, operations and decommissioning	Order of magnitude costs	• Base Cost - $341,000 • Contingencies - $89,000 • Total - $430,000 **Moderately Preferred**	• Base Cost - $380,000 • Contingencies - $99,000 • Total - $479,000 **Least Preferred**	• Base Cost - $317,000 • Contingencies - $82,000 • Total - $399,000 **Moderately Preferred**	• Base Cost - $221,000 • Contingencies - $57,000 • Total - $278,000 **Most Preferred**	• Base Cost - $319,000 • Contingencies - $83,000 • Total - $402,000 **Moderately Preferred**
SUMMARY			**MODERATELY PREFERRED**	**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**	**MODERATELY PREFERRED**

6.3.3.1 Natural Environment

Three criteria were used to evaluate the alternative access routes for the natural environment component including:

1. Vegetation/habitat removed or disturbed during construction of site access road and laydown area;
2. Disruption to Applewood or Serson Creek; and
3. Disruption related to natural hazards (floodplain, erosion).

Criteria: Vegetation/habitat removed or disturbed during construction of site access road and laydown area

For the criteria "vegetation/habitat removed or disturbed during construction of site access road and laydown area" there were two indicators used to evaluate each alternative access route:

1. Area and significance of vegetation removed; and
2. Potential for forest habitat fragmentation.

Indicator: Area and significance of vegetation removed or altered

Site preparation and the creation of roads will require the removal of vegetation, and therefore a reduction in the amount of natural habitat within the LWC Project Study Area. This reduction in natural habitat impacts biodiversity and the resilience of the remnant communities. Some areas, such as grasslands, provide breeding bird habitat for open country and early successional breeding birds. The impacted area and vegetation removal were considered during the evaluation. Routes that resulted in the least amount of vegetation removal or habitat alteration are preferred.

The relative regional significance (i.e. L-Rank) of the affected terrestrial communities was also considered in the evaluation. Routes that avoid impacts on communities of concern are preferred. GIS mapping of ELC communities was overlain on the route alternatives and the linear distance of routes through specific communities was measured using GIS tools. This allowed for an analysis of the relative significance of the terrestrial communities affected.

The new road may also provide new routes for invasive species and human encroachment. Disturbance in natural communities can provide pathways for invasive species, pets, and human activity causing impacts to native flora, fauna and soil (e.g., erosion, compaction). Routes that utilize existing trails or infrastructure are preferred as they result in fewer new disturbances that would allow invasive species establishment and encroachment. Potential impacts related to

invasive species and human encroachment were determined by professional judgment through qualitative analysis of the ELC and route mapping.

Route 1 crosses approximately 475 m of forest along the west side of Applewood Creek and another 200 m of forest would need to be removed to realign the river channel away from the valley wall. Tree removal for this route would occur in a L5 vegetation community. This route requires the most tree removal and is ranked least preferred.

Route 1B requires the removal of at least 25 mature trees along the Waterfront Trail. While these trees are not Species of Concern and the majority of the trees are located within L5 and L+ communities, they do provide ecological function for birds and wildlife. Route 1B is ranked moderately preferred due to fewer tree removal requirements than Route 1.

Route 3 cuts through the middle of an L3 woodlot community. The proposed route aligns with an existing break in the woodlot which minimizes tree removal or relocation to only a few mature trees. While the total number of trees requiring removal in Route 3 were low (less than Route 1B), the tree removal occurs in a community of higher significance. Due to tradeoffs between the number of trees removed and the significance of the vegetation community, Route 3 is also ranked moderately preferred.

Routes 2 and 3B involve removal of only a few trees along the route. The majority of these routes are located through L+ communities. No Species of Concern are affected. Routes 2 and 3B are considered most preferred.

All routes discharge out onto the beach through the L2 and L3 beach communities and as such, each route has the same relative effects in that area.

Indicator: Potential for forest habitat fragmentation

Larger, contiguous habitat blocks allow fauna and flora communities to be more resilient to development and increased user pressure. Although there are no ‘interior’ forest conditions present at Marie Curtis Park, the current forest patches are not bisected by roads or other infrastructure, and this condition should be maintained to the extent possible. The Marie Curtis Terrestrial Biological Inventory and Assessment (2012) recommends that recreation or other activities should be directed away from the main forest as much as possible. The assessment also indicates that the majority of habitat patches within the LWC Project Study Area are of poor quality, with the exception of a small meadow patch in the middle of the Arsenal Lands that is considered to have fair habitat quality. Routes that do not bisect contiguous forest blocks are preferred.

Forest habitat fragmentation was determined by professional judgment through qualitative analysis of the ELC and route mapping. Further ground-truthing with TRCA's forester was undertaken for each route to identify the specific trees that would need to be removed to accommodate a 12 m wide road way. Analysis of the significance of those tree removals were undertaken based on professional judgment.

Route 1 requires the removal of a large swath of forest along the western end of a woodlot and requires the removal of an additional 200 m swath within a woodlot to realign Applewood Creek. Additional fluvial geomorphologic studies would be required to clearly delineate the location and length of that additional fragmentation of the woodlot. Given these fragmentation impacts, Route 1 is ranked least preferred.

The effects on habitat fragmentation for Route 3 are somewhat mitigated by the fact that there is an existing gap in the woodlot that could accommodate much of the proposed access road. The proximity of an access route to the remaining mature woodlot would require extensive root protection works to ensure that further fragmentation of the woodlot (through mature tree die-off) does not occur. Given the potential impacts to the remaining woodlot from root damage, Route 3 is also ranked least preferred.

Route 1B requires removal of approximately 25 mature trees immediately east of Applewood Creek along the Waterfront Trail. This is a section of Waterfront Trail where tree canopy cover is nearly complete, despite the presence of the trail. Less tree removal is required for this route compared to Route 1 so this route is ranked moderately preferred.

Routes 2 and 3B require the least amount of tree removal to accommodate the proposed access routes. No significant increase in habitat fragmentation would occur as a result of these two routes so these routes are ranked most preferred.

Criteria: Disruption to Applewood or Serson Creek

For the criteria "disruption to Applewood or Serson Creek" there were two indicators used to evaluate each alternative access route:

1. Length and nature of disruption to Applewood or Serson Creek; and
2. Potential to impair water quality in off-line wetland areas.

Indicator: Length and nature of disruption to waterbodies (including Applewood, Serson and Etobicoke Creeks, and wetlands)

Disruption to creeks can result in alteration to creek function, fish habitat, changes to water quality, and changes to riparian vegetation. Routes that require creek alterations, or disturbance to riparian vegetation were evaluated for potential impacts to fish and fish habitat. Routes that minimally alter or disrupt ecological function in Applewood, Serson or Etobicoke Creek are preferred.

Mapping of fish habitat and fish communities, water flow and the route alternatives were examined through GIS and the relative impacts of each route was evaluated based on the professional judgment of an aquatic ecologist.

Route 1 requires the realignment of approximately 200 m of stream channel in Applewood Creek. This will have direct and significant impacts on fish habitat, water quality and riparian vegetation. Given these impacts, Route 1 is ranked least preferred.

Route 1B requires the construction of a temporary bridge crossing over Applewood Creek which should not impact fish habitat quality substantially. However, the crossing does increase the potential for direct discharges from vehicles and debris into the stream as thousands of trucks would cross directly over the water course to access the LWC Project. In addition, in the event of large flood events, the bridge structure may be designed to "fail" to ensure that the structure does not increase flood risk upstream. The failure of this structure could impact fish habitat quality downstream during the flood and during the process of retrieving the structure after the event. As a result, Route 1B is ranked moderately preferred.

Routes 2, 3 and 3B do not come within the regulated flood plain for Applewood, Serson or Etobicoke Creek. As such, these routes will not impact the creeks and are all ranked most preferred.

Indicator: Potential to impair water quality in Arsenal Lands wetland areas

Site preparation activities such as grading and filling may increase the risk of erosion and sedimentation in nearby wetlands. Other contaminants (oil, dust, salt, sand and debris) may also impact the water quality, which can negatively impact the success of amphibian breeding. Roads may impact the hydrology of wetlands and watercourses by creating barriers to overland flow, thereby restricting inputs to nearby wetlands or watercourses, and by creating increased run off from paved areas. Routes that avoid impacts to off-line wetland areas are preferred.

GIS was used to examine ELC, Arsenal Lands' wetlands and amphibian breeding survey data overlaid with the route alternatives. The relative impacts to the off-line wetlands were determined through professional judgment of an ecologist.

Three small wetland ponds are located within the LWC Project Study Area. These wetlands are known to contain breeding populations of amphibians. Routes 1 and 1B do not come near any of these ponds. As such, Routes 1 and 1B are ranked most preferred for this indicator.

Routes 2 and 3B both come within approximately 50 m of one of these ponds. Given the distances and ability to avoid these ponds with the construction access routes, Routes 2 and 3B are both ranked moderately preferred.

Route 3 is within 25 m of one pond and 50 m of another pond. The road runs along the entire length of the amphibian breeding area of the pond that is within 25 m. Given the increased exposure and risk to these wetlands, Route 3 is ranked least preferred.

Criteria: Disruption related to natural hazards (floodplain, erosion)

For the criteria "disruption related to natural hazards (floodplain, erosion)" only one indicator was used to evaluate each alternative access route: "nature of change on flood capacity and exposure to natural hazards".

Indicator: Nature of change on flood capacity and exposure to natural hazards

Road construction has the potential to interfere with existing runoff patterns by creating barriers and altering drainage within hazard lands. These impacts may result in restrictions in surface flow, thereby increasing flood risk upstream. It can also create risks to people, equipment and infrastructure from potential flooding of roads within the flood plain and potentially unstable valley slopes. Analysis was undertaken by professionals to assess the potential natural hazards to which each route is exposed. Routes deemed to have less impact on natural hazards are preferred.

In the case of Route 1, the access road descends a steep valley wall and requires 475 m of road construction within the flood plain. This represents a significant safety risk for people and infrastructure. It could also potentially increase flooding upstream due to infill within the flood plain. As a result, Route 1 is ranked least preferred.

Route 1B involves a single crossing of Applewood Creek. This crossing is approximately 18 m long, and would result in the approaches remaining within the regulatory flood plain of Applewood Creek. Under an extreme flood event, there is the potential that the approaches

would increase flood levels upstream. To mitigate these effects, a longer span bridge could be constructed at greater cost, or the bridge could be designed to fail. The latter would effectively shut the construction site down until the bridge could be restored. As a result of these issues, Route 1B is ranked moderately preferred.

Route 3 is in close proximity to two wetland ponds and would require crossings to be established over an unnamed ephemeral stream. Route 3 was not located within the regulatory flood plain for Etobicoke Creek. Given the proximity to these natural hazards, Route 3 is ranked moderately preferred.

Routes 2 and 3B are not in proximity to Applewood Creek, the unnamed ephemeral creek or Etobicoke Creek. They are approximately 50 m from one wetland pond. Given their limited exposure to natural hazards, Routes 2 and 3B are ranked most preferred.

Summary of Access Route Evaluation for Natural Environment Criteria and Indicators

Table 6.3 summarizes the access route evaluation for the natural environment. Routes 1 and 3 are ranked the lowest with Route 1 ranked least preferred for all three criteria and Route 3 ranked least preferred for two out of the three criteria. Route 1B is ranked as moderately preferred based on moderately preferred ranking in two out of three criteria. Both Route 2 and Route 3B are ranked most preferred for all three criteria and are, therefore, each ranked most preferred from the natural environment perspective.

Table 6.3 Summary Access Route Evaluation for Natural Environment

Environmental Component	Criteria	Route 1	Route 1B	Route 2	Route 3	Route 3B
Natural Environment	Vegetation/habitat removed or disturbed during construction of site access road and laydown area	Least Preferred	Moderately Preferred	Most Preferred	Least Preferred	Most Preferred
	Disruption to Applewood or Serson Creek	Least Preferred	Most Preferred	Most Preferred	Least Preferred	Most Preferred
	Disruption related to natural hazards (floodplain, erosion)	Least Preferred	Moderately Preferred	Most Preferred	Moderately Preferred	Most Preferred
SUMMARY		**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**	**LEAST PREFERRED**	**MOST PREFERRED**

6.3.3.2 Social Environment

Four criteria are used to evaluate the alternative access routes from the perspective of the social environment:

1. Disruption to use and enjoyment of Waterfront Trail;
2. Disruption to use and enjoyment of Marie Curtis Park;
3. Disruption to redevelopment of Arsenal Lands and Marie Curtis Park; and
4. Potential to disrupt traffic on Lakeshore Boulevard.

Criteria: Disruption to use and enjoyment of Waterfront Trail

For the criteria "disruption to use and enjoyment of Waterfront Trail" only one indicator was used to evaluate each alternative access route: "length of trail disrupted".

Indicator: Length of trail disrupted

Access road construction has the potential to disrupt the use and enjoyment of the Waterfront Trail in areas where the road is in proximity to or directly on the trail. Some sections of trail could be completely closed to users while construction is occurring. Routes that result in less disruption to trail users are preferred.

Route 1 crosses the Waterfront Trail at the entrance to the WWTF immediately south of Lakeshore Road. Since this is only a crossing of the trail, it will not result in a significant disruption to trail users. Thus, Route 1 is ranked most preferred for this indicator.

Routes 1B, 2 and 3B all follow considerable portions of the Waterfront Trail through the Arsenal Lands. The disrupted portion of Waterfront Trail within the City of Toronto will be limited. Effects to the trails within TRCA/City of Toronto limits should be minimized to within approximately 5 m of the boundary area. Any effects beyond this will be discussed with City of Toronto staff. These routes would require the closure of the trail through the Arsenal Lands which would dead-end the trail in Marie Curtis Park. To create a viable connection to the two ends of the trail, a temporary connection would need to be established along the south side of Lakeshore Road to allow trail users to bypass the access road during construction. Due to the significant length of trail that would be altered for these three alternative routes, they are ranked least preferred.

Route 3 requires a crossing of the trail near the beach volleyball courts in Marie Curtis Park. This option results in substantially less trail disruption that Routes 1B, 2 and 3B, but does impact a higher use portion of the trail than Route 1 so it is ranked moderately preferred.

Criteria: Disruption to use and enjoyment of Marie Curtis Park

For the criteria "disruption to use and enjoyment of Marie Curtis Park" only one indicator was used to evaluate each alternative access route: "area of Marie Curtis Park disrupted".

Indicator: Area of Marie Curtis Park disrupted

Access road construction has the potential to disrupt the use and enjoyment of Marie Curtis Park in areas where the road is in proximity to or directly within high use areas of the park. Some sections of the park could be closed to users while construction is occurring. Routes that result in less disruption to trail users are preferred.

Routes 1, 1B, 2 and 3B are all located away from the high use areas in Marie Curtis Park. There are no direct impacts to users of the park with any of these routes. These routes are all ranked most preferred.

Route 3 crosses the southernmost section of Marie Curtis Park resulting in disruption to park beach users in this area for the duration of the LWC Project. The affected area includes the portion of the park where beach volleyball courts have been installed by the City of Toronto. Based on this disruption, Route 3 is ranked least preferred.

Criteria: Disruption to redevelopment of Arsenal Lands and Marie Curtis Park

For the criteria "disruption to redevelopment of Arsenal Lands and Marie Curtis Park" only one indicator was used to evaluate each alternative access route: "nature of disruption to redevelopment activities".

Indicator: Nature of disruption to redevelopment activities

Plans have been developed by TRCA and the City of Toronto to redevelop Marie Curtis Park. Many of those works have been completed or are currently underway and include: dog off leash area (2011), parking lot decommissioning near beach (2012), beach volleyball courts (2012), Waterfront Trail upgrades (underway Spring 2013); and reforestation of woodlots (underway Spring 2013).

Furthermore, the City of Mississauga and TRCA were planning to proceed with a Parks Master Plan process for the Arsenal Lands in 2012 with implementation to proceed over the next several years. Those plans were put on hold to allow a temporary stockpile of clean fill within the Arsenal Lands for the LWC Project. The stockpile initiative was subsequently put on hold in the summer of 2012 which could allow the Parks Master Plan process for the Arsenal Lands to proceed. Resumption of the Parks Master Plan process would be complicated by a construction access route that bisects the plan area. Thus, the placement of site access routes has the potential

to disrupt works currently underway or recently completed in Marie Curtis Park, or to prevent the implementation of plans for the Arsenal Lands over the course of the LWC Project construction. Routes that result in less disruption of these plans are preferred.

Route 1 does not have any impact on the implementation of either plan. It allows the implementation of an Arsenal Lands Master Plan to proceed uninterrupted and avoids all enhancement activities in Marie Curtis Park. Route 1 is ranked most preferred for this indicator.

Routes 1, 2 and 3B each require some crossing of the Arsenal Lands redevelopment areas but allow for the majority of plans associated with the large meadow at 1400 Lakeshore Road to be implemented concurrently with construction of the LWC Project. These routes also avoid all enhancement activities in Marie Curtis Park (though the construction access route comes within a few metres of the terminus of trail upgrades). For these reasons, Routes 1, 2 and 3B are ranked moderately preferred for this indicator.

Route 3 bisects through the middle of the large meadow for the Arsenal Lands (at 1400 Lakeshore Road) which would result in delays in implementing the majority of plans for the Arsenal Lands. This route bisects areas where tree planting is planned in Marie Curtis Park and would cross the upgraded Waterfront Trail and run the length of the upgraded trail areas and cross the beach volleyball courts towards the LWC Project site. Route 3 is ranked least preferred for this indicator.

Criteria: Potential to disrupt traffic on Lakeshore Road

For the criteria "potential to disrupt traffic on Lakeshore Road" only one indicator was used to evaluate each alternative access route: "potential for truck traffic to affect the flow of traffic on Lakeshore Road".

Indicator: Potential for truck traffic to affect the flow of traffic on Lakeshore Boulevard

Trucks entering the LWC Project site from Lakeshore Road could disrupt traffic on Lakeshore Road due to the volume of daily construction traffic anticipated for the project. Truck traffic into the site is estimated to be between 200-250 trucks per day. Trucks entering the site from Lakeshore Road will be turning either right or left into the preferred access route depending on access from east or the west of the LWC Project. Traffic lights may be required at uncontrolled intersections due to the volume of daily truck trips to and from the site. Some fill is anticipated to come from the Hanlan water main site which may or may not require trucks to access the LWC Project via Lakeshore Road depending on the preferred route. Routes with existing traffic lights on Lakeshore Road and routes that can provide fill from the Hanlan water main site without using Lakeshore Road are preferred.

Routes 1, 1B, 3 and 3B are at uncontrolled intersections that may require traffic lights to be installed. Additional traffic lights on Lakeshore will further impede traffic flow. If it is determined that traffic lights are not required at these uncontrolled intersections, traffic would be impeded by trucks arriving from the east that would be turning left into the site. In addition, all four of these routes would require trucks delivering fill from the Hanlan water main site to enter back onto Lakeshore Road before accessing the LWC Project site. This would have further traffic implications on Lakeshore Road. For these reasons, Routes 1, 1B, 3 and 3B are all ranked least preferred for this indicator.

Route 2 has an existing traffic light at Lakeshore Road which would help to reduce traffic disruptions from LWC Project related traffic. This route also has a shared access with the Hanlan water main project which means that the LWC Project site can be accessed directly by trucks delivering fill from the Hanlan water main project without going back out to Lakeshore Road. For these reasons, Route 2 is ranked most preferred for this indicator.

Summary of Access Route Evaluation for Social Environment Criteria and Indicators

Table 6.4 summarizes the access route evaluation for the social environment. Routes 1B, 3 and 3B are ranked the lowest with route 3 and 3B ranked least preferred for all three out of four criteria and Route 1B ranked least preferred for two out of the four criteria. Routes 1 and 2 are ranked most preferred for social environment criteria with route 1 ranked most preferred for three out of four criteria and route 2 ranked most preferred for two out of four criteria.

Table 6.4 Summary Access Route Evaluation for Social Environment

Environmental Component	Criteria	Route 1	Route 1B	Route 2	Route 3	Route 3B
Social Environment	Disruption to use and enjoyment of Waterfront Trail	Most Preferred	Least Preferred	Least Preferred	Moderately Preferred	Least Preferred
	Disruption to use and enjoyment of Marie Curtis Park	Most Preferred	Most Preferred	Most Preferred	Least Preferred	Most Preferred
	Disruption to redevelopment of Arsenal Lands and Marie Curtis Park	Most Preferred	Moderately Preferred	Moderately Preferred	Least Preferred	Least Preferred
	Potential to disrupt traffic on Lakeshore Boulevard	Least Preferred	Least Preferred	Most Preferred	Least Preferred	Least Preferred
SUMMARY		**MOST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**	**LEAST PREFERRED**	**LEAST PREFERRED**

6.3.3.3 Cultural Environment

Four criteria were initially considered under the Cultural Environment:

1. Removal of designated heritage properties or attributes;
2. Disruption to designated heritage properties or attributes;
3. Proximity to heritage properties or attributes; and
4. Potential for archaeological resources.

Upon review of the proposed access routes, and a review of the available information, it was determined that none of the routes would involve direct removal or disruption to designated heritage properties or attributes. As such, all proposed access routes were considered most preferred. Only "proximity to heritage properties or attributes" and "potential for archaeological resources" were considered further in the analysis.

Criteria: Proximity to heritage properties or attributes

For the criteria "proximity to heritage properties or attributes" only one indicator was used to evaluate each alternative access route: "distance between road and heritage properties or attributes".

Indicator: Distance between road and heritage properties or attributes

While not designated under the *Ontario Heritage Act*, the Arsenal Lands (TRCA-owned property), located at 1400 Lakeshore Road in Mississauga, is identified as a Cultural Landscape (Site No. L-IND-3) for its direct association with Canadian wartime history. In order to reach the project site at the water's edge, a number of proposed access routes were identified through the Arsenal Lands.

Routes 1 and 1b do not travel any distance through the Arsenal Lands. Routes 2 and 3b travel along existing paved surfaces for approximately 245-m, before travelling along a new temporary road for approximately 85-m, and entering Region of Peel property where it connects with the existing Waterfront Trail. Route 3 travels primarily along existing paved surfaces for 390-m, bisecting the middle of the Arsenal Lands meadow, before entering Marie Curtis Park West. It should be noted that the potential impact of the proposed access routes on the future Master Planning process and implementation of the Arsenal Lands is assessed in Section 6.3.3.2 (Disruption to redevelopment of Arsenal Lands and Marie Curtis Park).

Visible remnants of the former uses of the Arsenal Lands include the water tower, outdoor firing range, and Long Branch Rifle Range. These features are independently designated as heritage properties, and are assessed below.

A number of heritage designations have been identified within the LWC Project Study Area, including:

- The Small Arms Building and Water Tower (By-law No. 0258-2009), located at 1400 Lakeshore Road East on TRCA-owned property. Key heritage attributes of the Small Arms Building which have the potential to be impacted by the access routes include the row of deciduous trees to the west, and a woodlot composed of 5-6 trees located to the southwest of the Small Arms Building;
- The Long Branch Indoor Rifle Range (By-law No. 0170-2012), located at 1300 Lakeshore Road on Region of Peel property; and
- A Notice of Intention to Designate has been issued for the Outdoor Firing Range, located at 1300 Lakeshore Road East on Region of Peel property. Key heritage attributes of the Outdoor Firing Range which have the potential to be impacted by the access routes include the 16 wooden baffles and concrete backstop.

Proposed routes that are further from designated heritage properties or attributes are preferred given the large number of vehicles anticipated to access the site over the years. Routes 1 and 3 avoid all designated heritage properties and attributes along their lengths. The closest heritage property to Route 1 is the down-range end of the Outdoor Rifle Range, which is approximately 70 m away. The closest heritage property to Route 3 is the Water Tower, which is approximately 115 m away. Routes 1 and 3 are ranked most preferred.

Routes 1B, 2 and 3B cross the eastern extent of the Outdoor Firing Range, along the existing Waterfront Trail, and are within 5 m of one of the baffles. The Outdoor Firing Range heritage designation includes a 30-m buffer on either side of the identified heritage attributes; however, with the use of construction fencing to separate the road from the baffles, it is not anticipated that these baffles will be impacted by construction access. Route 2 comes within 25 m of the northeast corner of the Small Arms Building. Each route moves southeast away from the Small Arms Building so for the majority of the length, the construction access route is over 65 m away from the building. There are no impacts anticipated on the Small Arms Building as a result of the Route 2 construction access. Routes 1B, 2 and 3B are ranked moderately preferred.

Criteria: Potential for archaeological resources

For the criteria “potential for archaeological resources” only one indicator was used to evaluate each alternative access route: “potential for unearthing archaeological resources as part of the access road creation”.

Indicator: Potential for unearthing archaeological resources as part of access road creation

A Stage 1 Archaeological Assessment was completed by TRCA archaeologists (2013) in support of the LWC Project. This study consolidated the results of a number of studies completed in the area over the last several years and included additional archival research. Conclusions for the Stage 1 Assessment indicated that:

- extensive areas within the LWC Project Study Area have potential for intact cultural heritage resources;
- proposed access routes located on lands identified as having potential for intact cultural heritage resources should be subject to a Stage 2 archaeological assessment;
- archaeological monitoring, followed by a Stage 3 and 4 archaeological assessment if necessary, is required for removal of parking lots as they may have capped existing archaeological heritage resources; and
- all areas deemed as disturbed require no further archaeological assessment.

Thus, alternative access routes with shorter lengths that avoid areas having potential for intact cultural heritage resources are preferred.

Route 3 has a 410 m section that crosses a large meadow within the Arsenal Lands that has been extensively disturbed (thus no additional assessments are required along this portion of the route). Furthermore, this route only requires a single crossing of the Waterfront Trail so the Waterfront Trail does not need to be temporarily relocated. There is approximately 140 m of proposed road length that would require a Stage 2 Assessment through the woodlot south of the large meadow, and an additional 265 m of road overlying the municipal landfill south of the woodlot. Route 3 is ranked most preferred.

Route 1 requires a single crossing of the Waterfront Trail near Lakeshore Road so the Waterfront Trail does not need to be temporarily relocated. However, a Stage 2 Assessment would be required for the 475 m of access road required east of the WWTF access road, and for approximately 200 m of channel realignment required for Applewood Creek. Since the length of required Stage 2 Assessment is longer than Route 3, Route 1 is ranked moderately preferred.

Routes 1B, 2 and 3B require a temporary relocation of the Waterfront Trail to the south side of Lakeshore Road for a distance of 420 m. The Stage 1 Assessment concluded that intact cultural heritage resources may be found along the south side of Lakeshore Road so Stage 2 Assessment is required. In addition, each of these routes has additional areas that would be subject to Stage 2 Assessments:

- Route 1B follows the Waterfront Trail for a distance of 700 m. The road will be several metres wider than the existing Waterfront Trail so there is the potential for intact archaeological resources along its length.
- Route 2 follows the Waterfront Trail for a distance of ~500 m, plus an additional 265 m of land was deemed as having potential for intact archaeological resources between Lakeshore Road and the Waterfront Trail.
- Route 3B follows the Waterfront Trail for a distance of ~500 m, plus an additional 340 m of land was deemed as having potential for intact archaeological resources between Lakeshore Road (at 1400 Lakeshore entrance) and the Waterfront Trail.

Since Routes 1B, 2 and 3B require substantially greater lengths of Stage 2 Archaeological Assessment compared to Routes 1 and 3 they are ranked least preferred.

Summary of Access Route Evaluation for Cultural Environment Criteria and Indicators

Table 6.5 summarizes the access route evaluation for the cultural environment. Of the two criteria which showed a difference between access route alternatives, Route 1 was ranked as having the most preferred (with one most and one moderately preferred). The remaining routes – 1B, 2, 3 and 3B – all had at least one criteria that was ranked least preferred and were therefore summary ranked as least preferred.

Table 6.5 Summary Access Route Evaluation for Cultural Environment

Environmental Component	Criteria	Route 1	Route 1B	Route 2	Route 3	Route 3B
Cultural Environment	Proximity to heritage properties or attributes	Most Preferred	Moderately Preferred	Moderately Preferred	Most Preferred	Moderately Preferred
	Potential for Archaeology Resources	Moderately Preferred	Least Preferred	Least Preferred	Most Preferred	Least Preferred
SUMMARY		**MOST PREFERRED**	**LEAST PREFERRED**	**LEAST PREFERRED**	**MOST PREFERRED**	**LEAST PREFERRED**

6.3.3.4 Technical/Engineering

Three criteria were considered for Technical/Engineering:

1. Ease of construction;
2. Ease of decommissioning; and
3. Potential to disturb contaminated soils.

Criteria: Ease of construction

For the criteria "ease of construction" only one indicator was used to evaluate each alternative access route: "issues which will complicate construction".

Indicator: Issues which will complicate construction

Construction access routes involve a number of standard "road construction" techniques that are systematic and applicable for a given unit length of road. However, variables such as (but not limited to) differences in topography, soils and hazards can produce substantive additional engineering challenges when developing a new construction access route. These additional engineering considerations are also usually associated with increased project risk and often cost. Construction access routes that require less "route specific" engineering solutions and as a result, are subject to less project risk are preferred.

Route 3 requires the least amount of additional engineering beyond standard road building techniques. This route involves some additional root protection measures where the road bisects the woodlot south of the large meadow, and involves some additional planning efforts to relocate or remove two large butternut trees within the proposed ROW. Route 3 was ranked most preferred.

Routes 2 and 3B require the removal of a couple mature trees and the creation of a temporary trail realignment along the south side of Lakeshore Road, in addition to the creation of the new access roads. Route 2 also involves minor separation works at the entrance to the Small Arms Building to prevent having Hanlan water main construction traffic from accessing the LWC Project access road. Routes 2 and 3B are ranked moderately preferred.

Route 1 involves substantive geotechnical works to create a sloped roadway into the Applewood floodplain. Large numbers of trees require removal, and approximately 200 m of Applewood Creek requires realignment. The majority of the access road would likely remain at risk due to flooding as it is located within the Applewood Creek floodplain. Route 1B requires the establishment of a temporary bridge crossing over Applewood Creek. Furthermore, this route involves the removal of more than 25 mature trees along the Waterfront Trail, and the creation of a temporary trail realignment along the south side of Lakeshore. Routes 1 and 1B are ranked least preferred.

Criteria: Ease of decommissioning

For the criteria "ease of decommissioning" only one indicator was used to evaluate each alternative access route: "issues which will complicate decommissioning".

Indicator: Issues which will complicate decommissioning

Construction access routes involve a number of standard "road decommissioning and restoration" techniques that are systematic and applicable for a given unit length of road. However, variables such as (but not limited to) differences in topography, soils and hazards, can produce substantive additional engineering challenges when decommissioning/restoring a route to its original conditions.

Construction access routes that require less "route specific" engineering solutions and as a result, are subject to less project risk are preferred.

Route 3 requires the least amount of decommissioning and restoration within the woodlot and south of the woodlot and is ranked most preferred.

Routes 2 and 3B require substantive trail reestablishment as part of the access road decommissioning, and reforestation along the Waterfront Trail and are ranked moderately preferred.

Route 1 involves substantial removals of the access road and extensive reestablishment of the forest cover along Applewood Creek. There may be a need to for further channel realignment works in Applewood Creek. Route 1B requires the longest stretch of Waterfront Trail to be reestablished as part of the road decommissioning. A substantial amount of reforestation will be required along the Waterfront Trail and some period of time will pass before the "character" of the enclosed mature canopy over the Trail will be reestablished. This route requires the proper decommissioning of the temporary bridge and approaches. Both routes 1 and 1B are ranked least preferred.

Criteria: Potential to disturb contaminated soils

For the criteria "potential to disturb contaminated soils" only one indicator was used to evaluate each alternative access route: "area of contaminated soils crossed".

Indicator: Area of contaminated soils crossed

Estimated costs for each access route do not take into account remediation costs to deal with potential soil contamination issues. Routes with higher potential to disturb contaminated soils will require additional remediation and costs associated with them.

Routes 1, 1B, 2, and 3B have some potential for spent lead bullets given their proximity to the rifle shooting range. Each of the routes may cross over potential municipal landfill for the last 50 to 60 m before reaching the lake edge. Thus, issues pertaining to potential soil contamination are deemed to be of equal concern between these four routes. Routes 1, 1B, 2, and 3B are all ranked most preferred.

Route 3 is ranked least preferred, largely due to the fact that for the final 265m, the proposed route will travel over a former municipal landfill area.

Summary of Access Route Evaluation for Technical/Engineering Criteria and Indicators

Table 6.6 summarizes the access route evaluation for technical/engineering. Routes 1 and 1B are both summary ranked as least preferred with each ranked least preferred for two out of the three criteria. Route 3 is summary ranked as moderately preferred based on most preferred ranking in two out of three criteria but least preferred for one criterion. Both Route 2 and route 3B are summary ranked as most preferred with each ranked moderately preferred for two out of three criteria and most preferred for one criterion.

Table 6.6 Summary Access Route Evaluation for Technical/Engineering

Environmental Component	Criteria	Route 1	Route 1B	Route 2	Route 3	Route 3B
Technical/ Engineering	Ease of construction	Least Preferred	Least Preferred	Moderately Preferred	Most Preferred	Moderately Preferred
	Ease of decommissioning	Least Preferred	Least Preferred	Moderately Preferred	Most Preferred	Moderately Preferred
	Potential to disturb contaminated soils	Most Preferred	Most Preferred	Most Preferred	Least Preferred	Most Preferred
SUMMARY		**LEAST PREFERRED**	**LEAST PREFERRED**	**MOST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**

6.3.3.5 Cost

Only one criterion was considered for Cost: Cost of construction, operations and decommissioning.

Criteria: Cost of construction, operations and decommissioning

For the criteria "cost of construction, operations and decommissioning" only one indicator was used to evaluate each alternative access route: "order of magnitude costs".

Indicator: Order of magnitude costs

Cost is an important measure when evaluating the viability of a construction access route. The cost breakdown is considered in three parts: upfront construction costs; operation costs; and decommissioning costs.

For the LWC Project, costs were established on the basis that a heavy duty industrial road will be established with a 9 m wide roadbed and an additional 3 m in the ROW to accommodate necessary fencing and protections. Differences in costs between routes are based on the specific technical challenges identified previously, such as bridge installations, geotechnical works, river realignments, and trial realignments. These costs do not include substantive soil remediation costs or archaeology, in the event that "significant heritage resources" are identified in the Stage 2 Assessments. Access routes that cost more are deemed less preferred.

At an estimated cost of approximately $278,000 including contingencies, Route 3 is ranked most preferred. Costs may increase substantively, depending on any site specific remediation required for construction and decommissioning given the length of road overlying the municipal landfill soils.

At an estimated cost of approximately $430,000, $399,000, and $402,000 including contingencies, respectively, routes 1, 2 and 3B are ranked moderately preferred.

- Route 1 involves substantive additional costs associated with geotechnical works, channel realignment works, and decommissioning costs.
- Route 2 and route 3 are essentially the same with substantive additional costs associated with the temporary realignment of the Waterfront Trail, and reestablishment of the Waterfront Trail following decommissioning of the access roads.

At an estimated cost of approximately $479,000 including contingencies, Route 1B is ranked least preferred. This route has more of the substantive additional costs associated with the temporary Waterfront Trail realignment, and reestablishment of the Waterfront Trail as Routes 2 and 3B, but it also has the added costs associated with the need for a bridge crossing over Applewood Creek.

Summary of Access Route Evaluation for Cost Criterion and Indicator

Table 6.7 summarizes the access route evaluation for cost. Route 1B, with the highest combined construction and contingency cost is ranked as least preferred. Routes 1, 2 and 3B are ranked as moderately preferred. Route 3 is ranked as most preferred as the least cost route.

Table 6.7 Summary Access Route Evaluation for Cost

Environmental Component	Criteria	Route 1	Route 1B	Route 2	Route 3	Route 3B
Cost	Cost of construction, operations and decommissioning	Moderately Preferred	Least Preferred	Moderately Preferred	Most Preferred	Moderately Preferred
SUMMARY		**MODERATELY PREFERRED**	**LEAST PREFERRED**	**MODERATELY PREFERRED**	**MOST PREFERRED**	**MODERATELY PREFERRED**

6.3.3.6 Summary of Access Route Evaluation

Based on the summary rankings for natural environment, social environment, cultural environment, technical/engineering and cost, route 2 of the alternative routes is deemed the most preferred access route for the LWC Project (see Table 6.8). Route 2 is the only option that is only ranked least preferred for one component (cultural environment) and most preferred for three components (natural environment, social environment and technical/engineering). Route 2 also represents a middle value for cost.

Table 6.8 Overall Summary of Access Route Evaluation by Component

Environmental Component	Route 1	Route 1B	Route 2	Route 3	Route 3B
Natural Environment	Least Preferred	Moderately Preferred	Most Preferred	Least Preferred	Most Preferred
Social Environment	Most Preferred	Moderately Preferred	Most Preferred	Least Preferred	Least Preferred
Cultural Environment	Most Preferred	Least Preferred	Least Preferred	Most Preferred	Least Preferred
Technical/Engineering	Least Preferred	Least Preferred	Most Preferred	Moderately Preferred	Most Preferred
Cost	Moderately Preferred	Least Preferred	Moderately Preferred	Most Preferred	Moderately Preferred
SUMMARY	**MODERATELY PREFERRED**	**LEAST PREFERRED**	**MOST PREFERRED**	**MODERATELY PREFERRED**	**MODERATELY PREFERRED**

6.4 PHASING PLAN AND CONSTRUCTION STEPS

The phasing plan for constructing the Preferred Alternative consists of two build-out scenarios as identified below. If the OPG waterlots are available at the commencement of construction, the entire footprint would be developed according to Build-out Scenario 1. If the OPG waterlots are not available at the commencement of construction, Build-out Scenario 2 would be implemented. Stages 3 and 4 in Build-out Scenario 2 would only commence if OPG waterlots became available

following Stages 1 and 2. There would be no difference in potential effects with either build-out scenario. The two build-out scenarios are outlined below:

Build-out Scenario 1 – OPG Waterlot Available at Commencement of Construction

Stage 1 – Land creation through establishment of 5 construction cells (depending on fill supply) filled sequentially connecting to the OPG pier.

Stage 2 – Park development on entire footprint connecting to the OPG pier.

Build-out Scenario 2 – OPG Waterlot not Available at Commencement of Construction

Stage 1 – Land creation through establishment of 4 construction cells filled sequentially connecting to the existing shoreline north of the OPG waterlots.

Stage 2 – Park development tie off to existing shoreline north of the OPG waterlots.

Stage 3 – Land creation of the final cell connecting to the OPG pier (if the waterlot becomes available at a later date).

Stage 4 – Park development to the OPG pier.

Stage 1 for both phasing options will include the acquisition of the unpatented waterlots on the bed of Lake Ontario (Crown Land) or Crown Land Use Permits to access such lands. These permits are required to implement the construction of the land base and associated shoreline protection. Timing for this stage is dependent upon the availability of appropriate fill material, funding and approvals. Since it is anticipated that construction will occur over a period of 7-10 years, it is anticipated that shore protection works and subsequent filling activity would be done as a series of cells where a temporary berm would be installed for a cell and tied off to the existing shoreline. Filling and grading activity could occur within a completed cell concurrently with shore protection works for the next cell. It is likely that the entire footprint would involve construction of 4-5 individual cells constructed one after the other. Stage 2 will include park development, including trail construction, creek crossings, signage and landscaping.

Sections 6.4.1 and 6.4.2 below provide a detailed description of the Phasing Plan, including the relative timing of construction activities. Appendix C details standard construction techniques and associated mitigation measures. It should be noted that the actual construction of the LWC Project components may rely on different construction techniques and phasing than those described in the subsequent sections, provided that the effects on the environment are not worse than described.

6.4.1 Stage 1 – Land Creation

Upon receipt of all required approvals, construction access will be via proposed Route 2 described in Section 6.3 and shown on Figure 6.16. Temporary construction access will include

the installation of temporary granular base, perimeter fencing, tree protection, site drainage improvements and removal of select vegetation as required.

A laydown area will be constructed at the site entrance near Lakeshore Road and will include a site trailer and appropriate parking for site workers and visitors.

Heavy construction equipment such as track loaders, dozers loaders, dozers and excavators will be left on site on site in their respective work locations at the end of each working day. Equipment will be fuelled on-site. Setbacks from sensitive habitats and natural hazard areas will be implemented. Appropriate setbacks will be determined through discussion with applicable agencies at detailed design. An emergency spill response plan will be developed and spill kits will be available on-site in case of any spills or leaks.

A portion of the existing shoreline protection will be removed to facilitate site filling activities. The bulk of the majority of material removed will be re-used in construction of the final shoreline protection. The lakefill process will begin with the construction of a confining dyke, progressing in a westerly direction from the construction access road on the east side of Applewood Creek towards the Ontario Power Generation's Lakeview piers.

Applewood Creek will be extended out into Lake Ontario by creating a temporary channel and lining both sides with inert material such as brick rubble, concrete or purchased aggregate. Appropriate sized culverts will be installed in the confining dyke structure in order to accommodate flows from Applewood Creek into Lake Ontario for the duration of the project. As the project nears completion, the final configuration for Applewood Creek will be constructed within the new lakefill and the temporary channel and culverts removed. If possible, the final configuration for Applewood Creek may be established prior to the end of construction; options will be explored during detailed design.

A laydown area will be constructed west of the temporary Applewood Creek channel and will accommodate trailers, staff and visitor parking.

The confining dyke may be made up of both purchased aggregate and/or clean, large broken concrete, brick and block rubble. As portions of the confining dyke are completed, and closed off to the open water, suitable earth fill material will be placed inside the dyke or cell to allow the operation to continue year round.

As the outer dyke nears both the Serson Creek baseflow culvert outlet and the Serson Creek overflow channel, a confining structure made up of inert material (brick rubble, concrete and rip rap) will be used to create a channel to extend flows out to Lake Ontario. Appropriate sized

culverts will be used to convey flows through the dyke and allow vehicles to cross and continue the outer core construction.

Interim drainage controls will be implemented as the lakefill progresses, which will include extending existing outfall and culvert pipes where necessary. Sediment control measures will be implemented as required to prevent overflows from eroding the newly filled areas. Final armouring of the shoreline will be completed in phases while lakefilling occurs within the confined portions of the dyke. The islands will be constructed after the initial land base is created. All in-water work will be completed between July 1st and March 31st in order to comply with outside the warm water fisheries regulations.

As the availability of suitable concrete rubble is often difficult to predict, construction phasing options allows some flexibility. The general economic climate, competition from concrete recycling operations, hauling distances and lack of road construction during the winter months all impact the potential supply of suitable concrete rubble and earth fill.

All disturbed areas will be temporarily stabilized as is feasible during on-going construction activities until final site restoration can be completed. Where possible, during detailed design opportunities for progressive rehabilitation will be explored. In addition, all construction debris, mud tracking etc. will be collected and removed from the site and adjacent roadways on an on-going basis and in a timely fashion.

It is anticipated that the majority of the fill volumes will be obtained from various Region of Peel, City of Mississauga and other public agency infrastructure projects and local private sources.

Equipment to be utilized for construction includes; track-mounted backhoe, loader, crane, dozer and off road trucks. All fuelling and equipment maintenance will be done at a safe distance from the water course to ensure that no deleterious substances enter the waterway.

6.4.2 Stage 2 – Park Development

This phase of the LWC Project will include the construction of park features. This includes a waterfront trail, landscaping, interpretive sign installation, pedestrian bridges, wetland feature and forest buffer.

7.0 DETAILED ASSESSMENT OF THE PREFERRED ALTERNATIVE

7.1 APPROACH TO STEP 4 DETAILED ASSESSMENT OF THE PREFERRED ALTERNATIVE

The provincial EA processes under which the LWC Project must seek approval requires a proponent to identify and detail the Preferred Alternative which minimizes negative effects to the environment and best meets the identified need for the project. The environment is defined broadly to include the natural, social, economic and cultural components and the identified need refers to the problem to be solved or the opportunity addressed. For the LWC Project, we are seeking to address the problem: an ecologically degraded and disconnected area of waterfront; and the opportunity: creating aquatic and terrestrial habitats and providing for public access to and along the waterfront as discussed in Chapter 2.

For all EAs, it is recognized that changes to project design and/or construction methods are likely to occur during detailed design between EA approval and construction. To address these changes, EAs have provisions for the proponent to assess whether or not the desired change makes the negative project effects worse. In general, any change to the project should mitigate project effects rather than make them worse. Therefore, if a proponent wished to manage flexibility they would define the project in a way that determined the worst acceptable level of impact at the EA stage or, in other words, assess a worst-case scenario. The impact assessment for this EA defines the *worst-case scenarios* for negative project effects, since these effects will not worsen should the project design or construction methods change, and can thus be easily dealt within the existing EA process.

The effects assessment presented in Section 7.3 is based on the LWC Project utilizing 2.0 million m^3 of clean fill to capture the "worst-case scenario" for any effects. A smaller potential footprint size of the Preferred Alternative, utilizing a lower limit of 1.5 million m^3 of clean fill, could also be established depending on the availability of fill material and budget considerations. The smaller footprint would maintain the same general shoreline configuration and habitat features as presented in Chapter 6. To maintain flexibility during detailed design while ensuring the "worst-case scenario" for any effects is captured in the EA, a sensitivity analysis is presented in Section 7.4 to determine if effects could increase on a smaller footprint.

The positive benefits of the LWC Project in creating a functional ecological system and providing public access to a section of the Mississauga Waterfront that is currently inaccessible are anticipated to greatly exceed any potential negative effects during construction. The establishment/post-establishment phase of the LWC Project includes a measurable improvement in ecological functioning over existing conditions, and lends itself to the use of minimum design requirements (i.e., elements of the design that are described in Chapter 6 and must be achieved at the end of construction).

The framework for this detailed assessment recognizes that the negative effects associated with the LWC Project are associated with construction, and thus lend themselves to bounding (*worst-case*) scenarios. If, following the completion of the detailed assessment, the design was to change within these worst-case bounds, the effects would likely be less, as demonstrated through the sensitivity analysis for a smaller footprint presented in Section 7.4, thus no re-evaluation would be required.

7.2 ASSESSMENT CRITERIA AND INDICATORS

Using the criteria developed during Steps 1 to 3 as a basis, a set of indicators and their associated measures were defined for construction and establishment to structure and, where possible, quantify the effects of the construction and establishment of the LWC Project on the environment.

7.2.1 Identifying Net Effects

For each indicator, the effects to existing conditions (Chapter 3) due to LWC Project works and activities (Chapter 6) were predicted. In some cases, no effects were predicted due to the application of mitigation or avoidance measures. Where net effects were predicted (i.e., effects remaining after mitigation is applied), they were classified as positive, negative, or negligible. Positive effects (e.g., improved habitat) are generally associated with establishment/post-establishment, and were quantified where possible. As described above, these are generally considered to be minimum design requirements that the LWC Project must achieve in detailed design and construction.

Effects that were either negative or negligible tended to be associated with construction activities. Negligible effects are generally short-term, localized, do not occur frequently, and can be minimized to a large extent through mitigation; these are often typical of construction projects. Examples of these include air and noise emissions from construction equipment and temporary rerouting of recreational trails.

Negative effects are those that mitigation could not minimize the effect to the extent that it became negligible, thus, the effect was considered a net negative effect of the LWC Project.

7.3 EFFECTS ASSESSMENT BY OBJECTIVE

The effects of the LWC Project on the existing environment, as well as proposed mitigation and resulting net effects are described in Sections 7.3.1 through 7.3.5. The discussions are organized by LWC Project objective; for each objective, effects are first presented in two tables (construction, establishment/post-establishment), and are followed by a summary description of the overall success of the LWC Project in meeting the objective.

While criteria for each objective could be relevant to both construction and establishment/post-establishment, it was determined that indicators, and criteria with no indicators, are relevant to only one phase. Table 7.1 provides the criteria and indicators by objective as well as to which phase the indicator is relevant. Table 7.1 also provides rational for each indicator.

Table 7.1 Effects Assessment Criteria and Indicators Relevant to Phase

Criteria	Indicator	Relevant to	
		Construction	Establishment/ Post-Establishment
Naturalization			
Ability of alternative to be self- compensating with respect to fish habitat	Area of aquatic habitat lost or altered (ha)	✓	
	HAAT model estimates of area requiring compensation (ha)	✓	
	Potential disruption to fish habitat as a result of land creation activities (siltation, fish removal, etc.)	✓	
Habitat removal or disruption during construction of site access road and laydown area	Terrestrial habitat and vegetation removed or disrupted.	✓	
	Number of Species at Risk removed/disrupted	✓	
	Aquatic habitat removed or disrupted	✓	
Change in shoreline character	Change in diversity of shoreline types created		✓
	Quantitative assessment of shoreline irregularity and the ability to provide nearshore habitat		✓
Ability to create functional habitat blocks	Area of habitat created of wetland, forest, and, meadow.		✓
	Assessment of improvements to aquatic habitat created and ecological benefits achieved through the changes to Serson and Applewood Creeks		✓
	Qualitative assessment of habitat created including benefits created by LWC with respect to filling in missing and/or impaired portions of aquatic and terrestrial ecosystems in this part of the Mississauga waterfront		✓
	Qualitative assessment of connectivity between habitats for the movement for wildlife (e.g. mammals, herptofauna, invertebrates, fish, birds, etc.)		✓
Effects of hydraulics and hydrology / sedimentation on sustainability of wetland communities	Qualitative assessment of ability to manage a full range of flows without adverse impact on wetland communities (high erosional stress, sediment deposits)		✓
	Influence of lake level fluctuation on channel and wetland connectivity		✓
	Potential for sedimentation to affect channel form (including river mouths) and associated vegetation		✓
	Qualitative assessments of the adaptability of the wetland function to climate change.		✓
	Qualitative assessment to determine the ability of river channels and shoreline works to accommodate changes in flow and lake levels due to climate change		✓

Table 7.1 Effects Assessment Criteria and Indicators Relevant to Phase (Cont'd)

Criteria	Indicator	Relevant to	
		Construction	Establishment/ Post-Establishment
Access			
Potential for change in access to and use of waterfront trail during construction	Duration and length of trail closed to use	✓	
	Potential for signalization of trail crossing with construction vehicles	✓	
Potential for change to use and enjoyment of park areas including waterfront trail during construction	Potential for dust and vehicle emissions and noise to affect Waterfront Trail use and enjoyment	✓	
	Potential for changes in ability to access and use park during construction due to traffic congestion and or changes to access	✓	
Potential for displacement of *built heritage resources* due to construction of access road, laydown area and land creation area	Cultural heritage value of built heritage resources and cultural heritage landscapes within land creation area	✓	
Potential effects from construction of access road, laydown area and land creation area on marine- and land-based archaeological resources	Significance of archaeological resources within footprint of land creation and associated park area	✓	
Potential for effect from construction of access road, laydown area and land creation area on traditional uses of lands by First Nations and Métis	Extent of traditional uses of lands within LWC Project Study Area	✓	✓
Potential for lookout areas	Number of opportunities for views and character of views from the LWC Project to Lake Ontario, OPG's Lakeview site to Lake Ontario and back to the cities of Mississauga and Toronto and from the Lake Ontario onshore		✓
Potential for changes to use of waterfront for recreation	Potential for changes to water quality at Marie Curtis Beach West with respect to swimming		✓
	Potential for changes to existing recreational activities on the sand beach at Marie Curtis Park west		✓
	Potential for changes to use for windsurfers and/or kiteboarders		✓
Potential for public access to water's edge	Percentage of accessible water's edge		✓
	Potential to create tiered trail system providing seasonal access (Waterfront Trail)		✓
	Potential to create multi-use trail connection across area of land creation		✓

Table 7.1 Effects Assessment Criteria and Indicators Relevant to Phase (Cont'd)

Criteria	Indicator	Relevant to	
		Construction	Establishment/ Post-Establishment
Compatibility			
Potential for construction traffic to affect traffic volumes on arterial roads and access and egress from arterial roads	Additional vehicle traffic on arterial roads resulting from construction	✓	
Potential for construction traffic volumes to require changes to intersections	Number of intersections requiring changes to facilitate LWC related construction traffic	✓	
Potential to affect operations at WWTF	Changes in access to outfall during construction	✓	
	Changes to access to outfall during establishment/post-establishment		✓
Potential for effects to water quality at Water Treatment Plant intakes	Potential for effects during construction	✓	
	Potential for effects during establishment/post-establishment		✓
Changes to site security for WWTF	Ability to maintain/enhance site security for the WWTF		✓
Changes to parking capacity	Potential to affect existing parking capacity at Marie Curtis Park and adjacent areas		✓
Coordination			
Consistency with City of Mississauga Waterfront Parks Strategy (2008)	Consistency of alternative with Waterfront Parks Strategy		✓
Consistency with the Visioning for Inspiration Lakeview	Consistency of alternative with Visioning for Inspiration Lakeview		✓
	Ability to integrate alternative with potential plans for OPG's Lakeview site		✓
Consistency with LOISS	Consistency of alternative with priorities identified by LOISS		✓
Consistency with Lake Ontario Biodiversity Strategy	Consistency of alternative with priorities identified by the Lake Ontario Biodiversity Strategy		✓
Consistency with Marie Curtis Park Revitalization Plan	Ability to integrate recreational opportunities and trails between the LWC, Arsenal Lands and Marie Curtis Park	✓	✓
MNR Lake Ontario Fish Community Objectives	Consistency with the goals of the MNR Lake Ontario Fish Community Objectives		✓
Consistency with CVC's hazard land guidelines and regulations.	Potential for flooding as a result of land creation		✓
Fiscal Viability			
Capital development cost	Capital Construction Cost estimate	✓	
Amount of fill material to be diverted from rural disposal sites	Volume of earth fill (soil) placed, brick ruble and concrete in cubic metres.	✓	
Economic and employment effects	Economic Output	✓	
	Gross Domestic Product	✓	
	# of direct full time jobs created	✓	
	# of indirect full time jobs created	✓	
	# of induced full time jobs created	✓	
Annual maintenance costs for naturalized area	Annual cost of maintenance of naturalized and park areas		✓

7.3.1 Objective 1: Naturalization

7.3.1.1 Construction Effects

Criterion: Ability of Alternative to be Self-Compensating with Respect to Fish Habitat

Indicator: Area of aquatic habitat lost or altered (ha)
Land creation activities will result in a loss of or alteration to, existing aquatic habitat in Lake Ontario. A significant amount of that area will be lost or altered permanently as a result of land creation activities, which will create new terrestrial habitats such as meadows, forests and treed swamps. The indicator was quantitatively assessed by measuring the footprint of the land creation of the Preferred Alternative from geo-referenced aerial imagery and the LWC Project Grading Plan (2013) in ArcGIS.

The LWC Project will result in altering up to 39 ha of open coast aquatic habitat. However, this habitat is currently degraded and the LWC Project will result in 23 ha of meadow, forest and treed swamp habitat, 1.5 ha of beach habitat, 7.5 ha of wetland and estuarine habitat and 1.4 km of fish habitat in Serson Creek (between Lakeshore Road and Lake Ontario). An additional 0.4 km of habitat may become available for fish migration north of Lakeshore Road, subject to the City of Mississauga's installation of new culverts at Lakeshore Road that are anticipated in the near future. CVC is working with the City of Mississauga to explore culvert crossing designs to include consideration of fish migration under Lakeshore Road.

With the creation of new habitat, the net effect of the loss or alteration of the current aquatic habitat is expected to result in a negligible effect on aquatic habitat and the establishment of higher quality habitat will have positive effects within the LWC Project Study Area.

Indicator: HAAT model estimates of area requiring compensation (ha)
DFO uses a suite of tools such as the Habitat Alteration Assessment Tool (HAAT) to assess the change in habitat amount and function (from a fisheries perspective) from an existing condition to the proposed modified condition based on the following four variables: area, depth, substrate, and cover. The model seeks to identify whether there is a net benefit or impairment to the existing ecological function of a project area for a suite of fish species.

In the case of the LWC Project, the area and type of fish habitat (as defined by depth, cover and substrate) lost and altered was measured, based on the footprint of the Preferred Alternative. Habitat suitability indices for six fish groups (warmwater piscivores, warmwater non-piscivores, coolwater piscivore, coolwater non-piscivores, coldwater piscivores and coldwater non-piscivores) were incorporated for all three life stages of the fish (adult, spawning, young of the year) to assess the anticipated change in habitat value resulting from the Preferred Alternative as

defined by the HAAT model. The HAAT model results indicate a deficit of 5.8 ha of fish habitat that would require compensation.

Recognizing that the HAAT model is only one of the assessment tools used to determine overall ecological benefits of the LWC Project, it is important to utilize professional judgment of the technical team to recognize additional ancillary ecological benefits that have not been accounted for in the HAAT modeling exercise. Ancillary ecological benefits include: improved watershed function; the inclusion of functional habitats in the design and increased primary and secondary production. Ecological benefits to the watershed will be achieved by connecting Serson Creek to Lake Ontario allowing fish movement into the Serson Creek watershed from the lake (approximately 1,800 m of Serson Creek will now be accessible to fish). Approximately 3,200 m of riparian habitat will be created which will improve stream habitat structure and availability. Finally, a net increase in primary and secondary production is expected through inputs of plant material, insects and amphibians and an increase in coastal forage species such as emerald shiners. From an aquatic habitat perspective, these features will create habitat improvements on both local and regional scales. Overall these improvements will provide a functional linkage between open coast, watershed and wetland habitats and adjacent aquatic habitat refuges such as Colonel Sam Smith Park, and Etobicoke Creek to the east and Lakefront Promenade Park and the Credit River to the west.

The LWC Project will significantly enhance the quality of fish habitat in an area of highly degraded fish habitat. Through discussions with MNR, DFO and Conservation Authority biologists during detailed design, it is anticipated that the ancillary ecological benefits that are not captured in the HAAT model will result in neutral (no) net effects on fish habitat.

Indicator: Potential disruption to fish habitat as a result of land creation activities (siltation, fish removal, etc.)

Activities pertaining to the construction of the LWC Project have the potential to have a negative effect on the natural environment. Berm construction and placement of fill has the potential to disrupt fish habitat in adjacent areas through siltation, release of deleterious substances, and entrapment of fish within the land creation area, resulting in a negative effect. A review of the expected effects and proposed mitigation measures was undertaken to evaluate this indicator.

For each phase of fill operations, a containment berm will be constructed prior to placing any fill which will eliminate sedimentation issues from fill placement operations. Once fill has been placed, there is potential for soils to be eroded by wind or water resulting in offsite sedimentation issues. This will be mitigated by stabilizing soils using standard soil stabilization techniques such as establishing vegetation cover upon completion of a construction cell. Potential disruption to fish as a result of land creation construction activities is expected to be short-term

in duration. In addition, a number of mitigation measures are proposed in order to mitigate effects related to siltation, the release of deleterious substances and direct effects on fish. A list of mitigation measures is provided in Appendix C.

The negative effects associated with construction of the landform are expected to be short in duration and mitigated with contractor requirements, fish salvage operations and the use of quarried stone products and construction rubble. As such, the net effects on fish and fish habitat will be negligible.

Summary of: Ability of Alternative to be Self-Compensating with Respect to Fish Habitat

Construction effects associated with fish habitat are expected to be negligible following the implementation of mitigation measures. Similarly, although the land creation is expected to result in the loss or alteration of 39 ha of aquatic habitat, more than 33 ha of higher quality terrestrial and wetland habitat and an additional 6 hectares of high quality aquatic habitat will be created. Therefore, the LWC Project is considered to be self-compensating with respect to fish habitat creating a positive effect.

Criterion: Habitat removal or disruption during construction of site access road and laydown area

Indicator: Terrestrial habitat and vegetation removed or disrupted

This indicator estimates the amount of vegetation required to be removed or disturbed for the construction access route. The amount of vegetation removed was estimated using GIS mapping of ELC communities overlain on the access route, and confirmed through visual surveys of the area.

Although the access route will follow the existing pathway, some vegetation (largely non-native trees) will require removal including the likely removal of portions of a 0.2 ha treed beach ridge. In addition, construction and use of the access route may result in a minor disruption to movement of medium sized wildlife species (e.g., installation of construction fencing may act as a physical barrier). Wildlife will likely find an alternate route around the construction site during active construction times.

A number of mitigation measures are proposed including removal of invasive species, salvaging native plant material and replanting of disturbed areas, where appropriate. Following decommissioning of the access route restoration of the treed beach ridge will be undertaken.

With respect to habitat effects, best management practices such as limiting vegetation removal to outside of the breeding bird period (March 15-July 31) will be implemented In addition, effects will be limited to the 7-10 year construction period.

With these measures in place the effect of vegetation removal and terrestrial habitat disruption will be negligible during construction. Efforts to restore any disturbed areas will be such that a positive effect is created.

Indicator: Number of Species at Risk removed/disrupted

Number of Species at Risk removed/disrupted was examined as an indicator. Several Species at Risk species (such as butternut and bobolink) have been identified within the LWC Project Study Area. This indicator measures the effects to Species at Risk species as a result of construction of the site access route. Species at risk mapping and known occurrences were compared to the proposed route to determine the likelihood and character of potential effects.

No Species at Risk have been identified within the proposed footprint of the construction access road and laydown area, so no effects to Species at Risk are anticipated. As part of the final road design and layout a detailed vegetation survey will be conducted to confirm the absence of SAR.

Indicator: Aquatic habitat removed or disrupted

The construction access route has the potential to remove aquatic habitat associated with surface water features in the LWC Project Study Area. This indicator measures the amount of aquatic habitat lost or potentially impacted. GIS mapping of ELC communities was overlain on the route and was measured using ArcGIS.

The construction access route is not within the floodplain of either Applewood or Serson Creeks and the road will be a minimum of 20 m from the existing wetlands. Combined with standard sediment and erosion control measures (e.g., installation of silt control measures) to mitigate any potential effects from sediment discharge, the potential effects to aquatic habitat from the installation and use of the site access road and laydown area is expected to be negligible.

Summary of: Habitat removal or disruption during construction of site access road and laydown area

The potential effects from the site access road and laydown area for construction of the LWC Project are expected to be negligible because limited vegetation removal is required, best management practices should limit wildlife effects, no Species at Risk have been identified within the footprint of the construction access road and laydown area and construction will not take place within the floodplain of Applewood and Serson Creek nor within 20 m of other aquatic habitat. Mitigation measures will be implemented including salvaging native plant material and the use of standard sediment and erosion control tools such as silt fencing.

Following construction, the re-vegetation or use of the construction access road in a form that supports future plans for the Arsenal Lands is deemed to have an overall positive effect with no mitigation measures identified.

Table 7.2 Objective 1: Naturalization (Construction Effects)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
Ability of alternative to be self- compensating with respect to fish habitat	Area of aquatic habitat lost or altered (ha)	• Land creation activities as part of the LWC Project will result in the loss or alteration of 39-ha of degraded open coast habitat within the Project Study Area.	• The 39-ha of aquatic habitat lost or altered due to land creation activities will be used to create: o 23-ha of meadow, forest and treed swamp habitat, which provides a suite of other ecological functions; o 1.5-ha of beach fish; and o 7.5-ha of wetland and estuarine habitat. • In addition, the realignment of Serson Creek will open up approximately 1.4 km of fish habitat, which is not currently available.	**Negligible** • While the loss or alteration of degraded fish habitat cannot entirely be mitigated strictly from an area perspective, the proposed changes in aquatic productivity and the opening of the Serson Creek watershed is anticipated to result in neutral impacts on fish habitat.
	HAAT model estimates of area requiring compensation (ha)	• The HAAT model indicates a deficit of 5.8 ha of fish habitat that will require compensation.	• The Project team will work with DFO biologists during detailed design to: o incorporate additional habitat features for specific fish species along: ▪ the new revetment sections (rocky shoals); and ▪ within the wetlands and estuarine habitats. • Wetland access gates will also contribute to further enhancements in wetland quality for fish habitat purposes.	**None** • Ancillary ecological benefits that are not captured in the HAAT model will result in no net effects on fish habitat
	Potential disruption to fish habitat as a result of land creation activities (siltation, fish removal, etc.)	• Fish habitat in the LWC Project Study Area may experience negative effects from construction activities including: o Water quality impairment due to siltation during placement of the stone; o Release of deleterious substances from construction equipment and construction site runoff; o Erosion of surface soils by wind and water following completion of a containment cell; and o Entrapment of fish within the land creation area. • No Species at Risk has been identified within the land creation activities.	• Use of best management practices such as: o To minimize siltation: ▪ construction of shoreline protection will follow the MOE Fill Quality Guidelines for Lakefilling in Ontario (March, 2003); ▪ using quarried stone products and construction rubble the increase in turbidity is expected to be low; and ▪ Placement will be limited to times when wave conditions allow safe construction operations and minimize potential for disruption of fill placement. o To minimize the risk of the release of any deleterious substance: ▪ Any stockpiled materials shall be stored and stabilized away from the water; ▪ Any part of a vehicle and/or equipment entering the water shall be free of fluid leaks and externally cleaned/degreased to prevent any deleterious substances from entering the water; and ▪ All disturbed areas will be stabilized and re-vegetated immediately following the work. o To reduce harm to the existing fishery: ▪ Open water construction operations will be undertaken between July 1 and March 31; ▪ fish salvage will be done to mitigate effects related to fish entrapment within the land creation area.	**Negligible** • Use of best management practices will ensure net effects to fish habitat are negligible.

Table 7.2 Objective 1: Naturalization (Construction Effects) (Cont'd)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
Habitat removal or disruption during construction of site access road and laydown area	Terrestrial habitat and vegetation removed or disrupted.	• The proposed route primarily follows an existing pathway, resulting in limited vegetation removal consisting of a couple of large mature trees and a stand of Staghorn Sumac. • Likely removal of portions of a 0.2 ha treed beach ridge that represents a rare natural heritage feature; • Potential to disrupt migratory wildlife species (e.g., birds and mammals) within the forest along the expanded trail.	• Although the remnant treed beach ridge is highly impaired, detailed design will evaluate options for restoration. • Native plant material will be salvaged and replanted elsewhere locally to preserve local plant genetics. • Disturbed areas will be replanted or brought to a rough grading condition in support of future plans for the Arsenal Lands. • Best management practices such as those related to *Migratory Birds Convention Act* will include: o vegetation removal will occur outside of breeding bird period (typically April 21-July 31); and o a nest survey will be conducted by a qualified avian biologist prior to commencing work.	**Negligible** • Negative effects during construction related to removal and disruption of vegetation and terrestrial habitat and disruption of wildlife are temporary and will be mitigated either during or following construction. •
	Number of Species at Risk removed/disrupted.	• Species at Risk have not been identified within the footprint of the construction access road; therefore, no effects to Species at Risk are predicted.	• As part of the final road design and layout a detailed vegetation survey will be conducted to confirm the absence of SAR.	**None** • Species at Risk have not been identified within the footprint of the access road.
	Aquatic habitat removed or disrupted.	• The construction access route is not within the regulated floodplain for either Applewood Creek or Serson Creek. • Potential for discharge of sediment from the road into a constructed wetland on the Arsenal Lands property.	• The access road will have a minimum setback of 20 m from the existing wetland. • Standard sediment and erosion control measures for site drainage will be utilized including: o installation of silt fences, blankets and berms; and o stabilization of exposed and newly constructed surfaces.	**Negligible** • Potential effects to the wetland on the Arsenal Lands property will be mitigated through the use of best management practices.

7.3.1.2 Establishment/Post-Establishment Effects

Criterion: Change in Shoreline Character

Indicator: Change in Diversity of Shoreline Types
The change in diversity of shoreline types refers to the difference, in metres, between the pre-construction and post-construction shoreline lengths by type (cobble beach, sand beach, and revetment). The increase in diversity at the Project Study Area will be an important step at improving the overall shoreline composition within the Regional Study Area. The pre-construction shoreline lengths by type were measured from geo-referenced aerial imagery using Arc GIS. Post construction shoreline lengths by type were measured from the LWC Project Grading Plan (2013).

The current 1,765 m of shoreline represents 2 different shoreline types: revetment (including a mix of armourstone, construction rubble and riprap); and sand beach (some of which is not publically accessible). Following construction, 2,880 m of shoreline will be composed of 6 different shoreline types (revetment, rocky island, cobble beach, gravel/cobble beach, sand/gravel beach and sand beach). The increase in shoreline diversity within the LWC Project Study Area will be an important first step at improving the overall shoreline composition within the LWC Regional Study Area. Benefits include: beaches provide increased access between terrestrial and aquatic habitats; the longer the shoreline the greater the distance available for wildlife to move between land and water and the greater function of the shoreline; lee island shorelines are more diverse and productive; and revetments lack structural diversity and do not provide productive beach habitat. The new shoreline could feature aquatic habitat features such as rocky point shoals. These features could provide additional complexity to the shoreline, on a local scale, by providing further shoreline irregularity, variations in substrate size and added vertical complexity which is beneficial to aquatic organisms. These additional features will be incorporated during detailed design. This increase in both diversity and length of substrate types represents a net positive effect in high quality nearshore habitat. No mitigation measures were identified.

The beach ridge currently found on the west side of Applewood Creek is currently succeeding. This area will be further isolated from coastal processes once the LWC Project is established. The area will still experience periodic flooding from Applewood Creek; however, the change in exposure may influence vegetation succession over time.

Currently, the east side of Applewood Creek is dominated by invasive species and these conditions could be improved upon establishment.

Indicator: Quantitative assessment of shoreline irregularity and the ability to provide nearshore habitat

The shoreline irregularity factor describes the irregularity of a shoreline and the potential for the creation of additional nearshore habitat. The shoreline irregularity factor is a ratio which compares the post-construction and pre-construction shoreline lengths. A ratio greater than 1.0 indicates that the LWC Project provides more nearshore habitat than the existing conditions. The greater this ratio, the more irregular the shoreline and the greater the ecological value of the transition from water and land.

To calculate the ratio, pre-construction shoreline lengths were measured from geo-referenced aerial imagery and post construction shoreline lengths were measured in ArcGIS.

The post-construction shoreline is 1.6 times more irregular/longer than the current shoreline. The preferred design increases shoreline irregularity and the ability to provide nearshore habitat and will be similar to features that would occur naturally along the north shore of Lake Ontario, while still providing the necessary stable shorelines. Net effects from the LWC Project on shoreline irregularity and nearshore habitat are positive and, as a result, no mitigation measures are required.

Summary of Change in Shoreline Character

The increase in shoreline diversity and irregularity will result in improved nearshore habitat in the LWC Project Study Area.

Criterion: Ability to create functional habitat blocks

Indicator: Area of habitat created (ha) of wetland, forest, and, meadow

This indicator measures the area of habitat in the Preferred Alternative to ensure general compliance with recommended minimum habitat size guidelines: 3.5-ha to 9-ha of wetland; 4-ha of forest; and 10-ha of meadow. The sizes of the habitats were measured using Arc GIS. These values were compared to the minimum habitat guidelines set out earlier in the process (see Chapter 6).

The LWC Project will create approximately 33 ha of new terrestrial and wetland habitat and exceeds the minimum recommended habitat size guidelines including 3.5-ha to 9-ha of wetland, 5 ha of forest and 14.5 ha of meadow; as such, this indicator results in a net positive effect following construction. No mitigation measures are required.

Indicator: Assessment of improvements to aquatic habitat created and ecological benefits achieved through the changes to Serson and Applewood Creeks

This indicator measures: (a) the length of new stream habitat created in metres; (b) the ability of the watershed to connect to the lake; and (c) connection(s) created to the wetland features. The pre-construction shoreline lengths were measured from geo-referenced aerial imagery and post construction shoreline lengths were measured in ArcGIS.

The establishment of the new river channels and coastal wetlands for Serson and Applewood Creeks will create a new watershed connection to Lake Ontario (in the case for Serson Creek), and will reestablish coastal wetland habitats at the mouths of both creeks. The LWC Project will create and provide access to additional high quality fish habitat including coastal wetland habitat, resulting in a net positive effect. No mitigation measures are required.

Indicator: Qualitative assessment of habitat created including benefits created by LWC with respect to providing missing and/or impaired portions of aquatic and terrestrial ecosystems in this part of the Mississauga waterfront

This indicator qualitatively evaluates the ability of the Preferred Alternative to provide an increase in ecologically functional areas within this part of the Mississauga waterfront. The qualitative assessment was undertaken by terrestrial and aquatic ecologists, who reviewed the refined Preferred Alternative with respect to the local aquatic and terrestrial ecosystems along the Mississauga waterfront. The refinements were further reviewed in the context of LOISS and the City of Mississauga's Landscape Scale Analysis: Natural and Semi-natural Habitats and Opportunities for Enhancement Final Technical Report (CVC 2012).

The LWC Project will produce an increase in natural habitat cover within the LWC Regional and Project Study Areas, providing critical stepping-stone habitat for birds, mammals, fish and other wildlife to other isolated greenspaces along the Lake Ontario shoreline and further upstream within the watersheds. Consolidated and connected forest, meadow and wetland habitat patches are arranged linearly in proximity of the shoreline, which provides optimal ecological function for migratory stop-over habitats, buffers to adjacent urban areas, and longshore corridors from Etobicoke Creek westwards. Potential negative effects related to invasive species colonizing the created habitat will be mitigated using adaptive management and best management practices such as identifying target invasive species for removal and the use of access gates at the inlets of Applewood and Serson Creeks to control against undesirable species. Despite the potential for some invasive species to occupy the naturalized area even with the application of best management practices, net effects are expected to be positive.

Indicator: Qualitative assessment of connectivity between habitats for the movement of wildlife (e.g. mammals, herptofauna, invertebrates, fish, birds, etc.)

Wildlife may require access to a variety of habitat types to fulfill various aspects of their lifecycle and/or behaviours such as foraging, feeding and reproduction. The ease of access throughout the habitat may encourage or discourage movement between the various habitat types. This indicator assesses the functionality of the habitat. The functional habitat blocks were reviewed by terrestrial and aquatic ecologists with respect to their ability to provide functional habitat blocks and connectivity between habitats.

The LWC Project will result in improved connectivity within and outside the LWC Project Study Area. The newly created habitat will provide the potential for migratory birds, bats and insects to move through the LWC Project Study Area as vegetation matures. New connections between the creeks, Lake Ontario, the newly created wetlands and the Serson Creek watershed will be significantly improved over current conditions.

The LWC Project will result in an overall improved connectivity; across the shoreline; to existing terrestrial communities; between the water/land interfaces and between the newly created vegetation communities.

Summary of: Ability to create functional habitat blocks

The creation of additional wetland, forest and meadow habitat will result in the provision of critical habitat for aquatic and terrestrial biota including the creation of stepping stone habitat for migratory species. The use of mitigation measures is expected to minimize/eliminate any negative effects non-native and/or invasive species may have on the newly created habitat. Overall, the LWC Project is expected to result in positive effects by creating functional aquatic and terrestrial habitat blocks.

Criterion: Effects of hydraulics and hydrology/sedimentation on sustainability of wetland communities

Indicator: Qualitative assessment of ability to manage a full range of flows without adverse impact on wetland communities (high erosional stress, sediment deposits)

Variable flow conditions have an effect on wetland communities. This indicator measures the potential effect of variable flow conditions on the wetland communities. This indicator was assessed by professional judgment comparing existing conditions against changes that would occur by developing the Preferred Alternative.

Both Serson and Applewood Creeks have been designed to contain flows up to the 5 year event. The main channel cross section will convey the 2 year flow while levees will contain the 5 year flow. Flows beyond this capacity will spill into the wetland features. Hydraulic conditions within the creeks are likely to be low velocity with little energy to erode the boundaries; therefore, erosional stress on the wetland boundaries is not anticipated to be an issue. Sedimentation in the design channel is likely to naturally occur, but it is expected that the channels will be able to manage sediment over time by flushing it out during higher, less-frequent flows (2-year and higher). The design will maintain flow between Applewood and Serson Creeks and Lake Ontario. As such, there is negligible effect anticipated from flows on the wetland communities.

Indicator: Influence of lake level fluctuation on channel and wetland connectivity

Low lake levels caused by daily, seasonal and long-term lake level fluctuation may result in limited connectivity between the channel and wetlands. This indicator measures the ability of the low flow channel to maintain connectivity with the feeder outlets during low lake conditions.

The designs for Applewood and Serson Creek incorporate the anticipated high lake level and the monthly low lake level to produce a profile that will ensure connectivity to Lake Ontario under both conditions. Levels at the outlets successfully convey the 5-year flood for each creek at a lake level of 75.4 masl. The design should ensure that the creeks do not become 'perched' during flow conditions based on current available data, and they are designed to meet the low lake level of 73.75 masl. The design maintains connectivity at the downstream end and does not account for any potential disconnects upstream. Under low lake levels the backwater effect will be reduced in the channel and the drop in water level may lead to higher velocities flushing out accumulated sediments. Low lake levels are not anticipated to effect connectivity with the wetlands.

Based on the design, Lake Ontario water level is expected to have minimal effect on channel and wetland connectivity. The wetlands will be built with significant bathymetric variation to respond to changing lake levels. Areas that may be deep open water in the wetland may become emergent habitat on low lake level years and conversely, submergement/emergent vegetation areas may become open water habitat during very high lake level years. As such, no mitigation measures are proposed and net effects are expected to be negligible.

Indicator: Potential for sedimentation to affect channel form (including river mouths) and associated vegetation

The potential risk for sedimentation in the creeks is relatively low. In Serson Creek, there is low sediment supply which consists of mainly fine sediments (very fine sand to small cobble) which will be easily transported through the system. For Applewood Creek, sediment load and size is slightly larger (pebble to small boulder; however, transport of sediment mainly consists of

redistribution within the channel. Applewood has several large bar features and it is assumed that the new designed section will similarly re-work sediments as bars and riffles but will likely not move large volumes of sediment in the downstream direction. While the movement of the sediment within the channel may result in some accumulation, it is likely this will be temporary and sediment transport processes within the channel are expected to balance naturally.

Given that neither Applewood Creek nor Serson Creek are expected to result in anything more than temporary sedimentation, no mitigation measures are proposed and the overall expected effect is negligible.

Indicator: Qualitative assessments of the adaptability of the wetland function to climate change

Climate change has the potential to increase the size and frequency of large flood events, influence winter ice cover conditions and potentially influence long-term average lake levels in Lake Ontario. This indicator measures the ability of the Preferred Alternative to accommodate these changes. Potential effects were assessed from a qualitative perspective.

Larger and more frequent storms could result in increased discharge to the wetlands and any potential drop in the level of Lake Ontario could result in disconnection from the lake. In either situation, the water control gates located at the inlets of the wetlands will allow for the management of water levels.

Most climate change models suggest future increases in the average temperature in Ontario. An increase in temperature is likely to reduce the frequency and extent of ice formation in wetlands. Where ice does form in the wetlands, there is a risk of "ice plucking[16]" of wetland vegetation and soils if large rain storms cause a rapid increase in stream and wetland water levels. High flows resulting from winter storms under mild weather conditions will likely flow on top of the wetland ice, rather than lift it from below. As such, the risk for ice plucking of wetland soils and vegetation in the design will be low. In the event that the ice plucking does occur, the installed water level control gates would enable CVC staff to lower water levels during the following spring, summer and fall to encourage new vegetation growth to re-establish in the wetlands.

Based on the ability to actively manage water entering and exiting the wetlands and the expectation that the wetland vegetation is expected to adapt and thrive based on the frequency and duration of inundation and reductions in ice cover, the overall effects on the wetlands from climate change is expected to be negligible.

[16] Ice plucking refers to a natural process where ice attaches to vegetation and soils within a wetland and rising water level raise the ice causing vegetation and/or soils to detach from the bed.

Indicator: Qualitative assessment to determine the ability of river channels and shoreline works to accommodate changes in flow and lake levels due to climate change

Effects from climate change could impact the river channels and shoreline works because of the potential to increase the size and frequency of large storm events as well as prolonged periods of low precipitation, both of which will potentially influence the average level of Lake Ontario. This indicator qualitatively assesses how well the Preferred Alternative can accommodate these changes.

Climate change has the potential to result in increased flooding upstream of Lake Ontario in both Applewood and Serson Creeks as well as potentially increase scour. However, a potential drop in the level of Lake Ontario may improve water conveyance down Applewood and Serson Creeks. Overall, the annual variability associated with the potential effects of climate change are expected to result in the system finding a balance and the net result is expected to be negligible.

Summary of: Effects of hydraulics and hydrology / sedimentation on sustainability of wetland communities

Both Serson and Applewood Creeks are designed to contain the 2 year and 5 year flow; any flow beyond this capacity will spill into the wetland features. Wetlands will function most optimally with a variability of flow and water control gates at the inlets will allow for management of water levels with the influence of natural variability including low water levels in Lake Ontario. Sedimentation is not expected to be an issue in either creek, and therefore to either wetland feature, although Applewood Creek is noted to have a higher sediment load.

Effects due to changes in storm frequency and severity as well as lake level will either be managed through the use of the water control gates are expected to be minimal because of the expected adaptation ability within the system.

Overall, net effects of hydrology and sedimentation on wetland communities are expected to be negligible.

Table 7.3 Objective 1: Naturalization (Establishment/Post-Establishment Effects)

<table>
<tr><th>Criteria</th><th>Indicator(s)</th><th>Effects</th><th>Mitigation Measures</th><th>Net Effects</th></tr>
<tr><td rowspan="2">Change in shoreline character</td><td>Change in diversity of shoreline types.</td><td>• The increase in shoreline diversity within the LWC Project Study Area will be an important first step at improving the overall shoreline composition within the LWC Regional Study Area.
• Within the LWC Project Study Area, shoreline will increase from 1,765 m to 2,880 m which can be broken down by shoreline type as follows:
<table>
<tr><th>Shoreline Type</th><th>Existing (m)</th><th>LWC (m)</th></tr>
<tr><td>Revetment</td><td>1,325</td><td>1,285</td></tr>
<tr><td>Private beach</td><td>205</td><td>0</td></tr>
<tr><td>Public beach</td><td>235</td><td>1,110</td></tr>
<tr><td>Lee rocky island shoreline</td><td>0</td><td>485</td></tr>
<tr><td>Total Shoreline</td><td>1,765</td><td>2,880</td></tr>
</table>
o The current shoreline behind the proposed LWC Project footprint includes 235 m of publically accessible sand beach that will be replaced with 1,110 m of new beach including:
▪ 795 m of cobble beach ranging in size from 10 to 20 cm (median size of 15 cm);
▪ 265 m of gravel/cobble beach ranging in size from 1 to 10 cm (median size of 5 cm);
▪ 50 m of sandy/gravel beach ranging in size from 1 to 5 cm (with sand predominance in the summer and the smaller gravel-pebbles in the winter);
o the majority of the western most sand beach behind the land creation area (235 m of which is publically accessible) will remain in place as a sandy beach ridge area behind the land creation.
• The provision of shallow sand and gravel substrates provide high quality habitat for nearshore cyprinids for spawning and feeding.
• The cobble beach provides excellent staging and nursery areas.
• The addition of surcharged points and shoals provide additional nearshore habitat.
• Net decrease in revetment shoreline to be replaced by mostly cobble beach, providing a net benefit to aquatic habitat.</td><td>None.</td><td>Positive
• Increase in diversity and length of substrate types, which provides an increase in high quality nearshore habitat.</td></tr>
<tr><td>Quantitative assessment of shoreline irregularity and the ability to provide nearshore habitat.</td><td>• The increase in shoreline irregularity at the local level will be an important first step at improving the overall shoreline within the LWC Regional Study Area.
• The new shoreline will provide a shoreline that is 1.6 times longer than the former shoreline over the same area.
• The new shoreline simulates natural shoreline irregularity with features such as headlands and islands, which will provide a sheltering effect for fish and wildlife.</td><td>None.</td><td>Positive
• Shoreline irregularity will increase and nearshore habitat with features that are similar to those that would occur naturally along the north shore of Lake Ontario will be provided.</td></tr>
<tr><td>Ability to create functional habitat blocks</td><td>Area of habitat created (ha) of wetland, forest, and, meadow.</td><td>• The LWC Project will create approximately 33-ha of terrestrial and wetland habitat, including:
o 14.5-ha of meadow;
o 1.5-ha of beach;
o 5-ha of forest;
o 7.5-ha of wetland;
o 3.5-ha of treed swamp; and
o 1-ha associated with rocky island habitat.
• LWC Project exceeds minimum recommended habitat size objectives.</td><td>None.</td><td>Positive
• The LWC Project will result in the creation of approximately 33-ha of new terrestrial and wetland habitat and will exceed minimum habitat size objectives.</td></tr>
</table>

Table 7.3 Objective 1: Naturalization (Establishment/Post-Establishment Effects) (Cont'd)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
Ability to create functional habitat blocks (Cont'd)	Assessment of improvements to aquatic habitat created and ecological benefits achieved through the changes to Serson and Applewood Creeks.	• The LWC Project will: o provide critical habitat for a range of life cycle stages, including reproduction; and o improve the ability for certain species to migrate along the shoreline by providing stream and wetland refuge areas during severe events along the open coast of Lake Ontario. • The LWC Project will connect Serson Creek with Lake Ontario up to Lakeshore Road. Combined with enhancements of the Lakeshore Road crossing undertaken by the City of Mississauga within the Regional Study Area, the new Serson Creek realignment will effectively connect the entire Serson Creek watershed to Lake Ontario. • New river channels and coastal wetlands for Serson and Applewood Creeks will: o create approximately 240 m and 330 m of critical highly productive fish estuary habitat within the land creation area for Applewood Creek and Serson Creek, respectively; o open up approximately 690 m of new stormwater channel for Serson Creek; o create a new watershed connection to Lake Ontario for Serson Creek, providing continual connectivity for fish; and o re-establish highly productive fish coastal wetland habitats at the mouths of both creeks that will provide continual connectivity to the wetlands for riverine and pelagic fish. • Potential for fish to become trapped in Serson and Applewood Creek during construction. • Potential disruption of fish migration in the lower portions of Applewood Creek (between Lake Ontario and Lakeshore Road). • Realignment of Serson Creek north of the WWTF will: o require the removal of juvenile trees within the existing stormwater channel; this removal is necessary to ensure flow conveyance maintenance; and o require the infilling of the existing baseflow channel downstream from the stormwater channel entrance. The existing baseflow channel downstream from the sediment plug will remain in place, to allow floodwaters that overtop the channel to continue to be discharged through the culvert under the WWTF, providing additional flood conveyance under large events. Locally generated surface flows will also continue to flow through the culvert. • No fish have been surveyed in the existing Serson Creek channel north of the WWTF. As such, the realignment will allow fish access to the Serson Creek watershed. • To improve habitat within the stormwater channel (which will become the primary river channel for Serson Creek), no modifications to the underlying soils of the bed and banks will occur. • Aquatic habitat features such as rocky steps will be incorporated within the channel as well as riparian vegetation plantings along the top of valley in areas where it will not increase flood risk, affect flow conveyance or promote bank erosion.	• Fish salvage will occur following the establishment of the confinement cells during the initial filling stages. • Opportunities to add habitat features will be explored further during detailed design. • For the realignment works of Serson Creek: o the channel will be isolated and a fish salvage conducted to ensure no fish remain in the construction area of the channel; o the banks of the stormwater channel will not be excavated; o incorporation of rocky steps and installation of riparian vegetation plantings as aquatic habitat features; and o existing soils will not be disturbed within the stormwater channel.	**Positive** • Creation of highly productive aquatic habitat not previously available. • Connections to the Serson Creek watershed and wetlands will provide an additional linkage that will transform this degraded site into a regionally productive site by linking Lake Ontario to the wetlands and watersheds.

Table 7.3 Objective 1: Naturalization (Establishment/Post-Establishment Effects) (Cont'd)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
Ability to create functional habitat blocks (Cont'd)	Qualitative assessment of habitat created including benefits created by LWC with respect to filling in missing and/or impaired portions of aquatic and terrestrial ecosystems in this part of the Mississauga waterfront.	• The LWC Project results in: o the creation of approximately 33-ha of new terrestrial and aquatic habitat features. The newly created habitat will provide areas of isolated wildlife refuge where plants and wildlife remain undisturbed and nature is encouraged; o a diversity of shoreline habitats that are moderately sheltered will be created; o a treed swamp providing critical habitat linkages for certain species of amphibians, reptiles and birds between the Serson Creek wetland complex and the Applewood Creek wetland complex; and o important habitat for local bird and wildlife species, in conjunction with habitats provided in Marie Curtis Park and the Arsenal Lands due to the proximity and arrangement of the forest, meadow and wetland complexes. • Potential negative effects relate to the establishment of nuisance and invasive species, such as Canada Geese, Common Carp and *Phragmites* in the wetlands; and Dog Straggling Vine and Garlic Mustard in meadows and forests. These species have the potential to negatively affect the ecological function and quality of the habitat patches created by outcompeting and displacing desirable native species.	• Best management practices during construction will be used to minimize invasive species developing on the site including: o Avoiding transport of non-native and invasive species into sensitive vegetation communities; and o Cleaning all equipment working in identified invasive species locations. • Incorporation of access gates at the inlets between the estuarine channels and coastal wetlands will control against undesirable species such as Common Carp. • Maximizing natural vegetation cover within the wetland and along the adjacent terrestrial areas will help to reduce the numbers of Canada Geese.	**Positive** • Potential effects related to the establishment of invasive species will be mitigated through best management practices. • Created habitat patches provide an increase in ecologically functional areas within this part of the Mississauga waterfront resulting in a net positive effect.
	Qualitative assessment of connectivity between habitats for the movement for wildlife (e.g. mammals, herptofauna, invertebrates, fish, birds, etc.).	• The LWC Project will result in improved connectivity within and outside the LWC Project Study Area, and improved structure to the vegetation communities created. • Newly created habitat will provide the potential for wildlife to move through the LWC Project Study Area as vegetation matures. • Connections to creeks from lake to newly created wetlands, estuary and upper watershed will be significantly improved over current conditions. In particular, Serson Creek will be reconnected to Lake Ontario and allow fish to re-colonize and utilize the currently fishless Serson Creek.	None	**Positive** • The LWC Project will result in overall improved connectivity; across the shoreline; to existing terrestrial communities; between the water/land interfaces and between the newly created vegetation communities.
Effects of hydraulics and hydrology / sedimentation on sustainability of wetland communities	Qualitative assessment of ability to manage a full range of flows without adverse impact on wetland communities (high erosional stress, sediment deposits).	• Modeling shows that: o velocities during the 2-year return event decrease from 6m/s near Lakeshore Road, to 1.3m/s in the design channel for Applewood Creek; o Serson Creek flow velocities increase between Lakeshore Road and the channel design, which is likely a result of the slightly steeper gradient of the existing overflow channel. • Both Serson and Applewood Creeks have been designed to contain the 2 year and 5 year flow. Flows beyond this capacity will spill into the wetland features. • Hydraulic conditions within the creeks are likely to be low velocity with little energy to erode the boundaries due to backwatering from Lake Ontario. • An extreme flow event could result in sedimentation that could block wetland connections.	• Capacity to manage stormwater within the wetland features has been provided by: o varying wetland depth; and o use of a water control structure to regulate wetland water levels.	**Negligible** • The channel will manage sediment over time and flows will be conveyed through to Lake Ontario within the design channel and berms of a 5-year capacity. • Sedimentation due to extreme flow will be evaluated when necessary.

Table 7.3 Objective 1: Naturalization (Establishment/Post-Establishment Effects) (Cont'd)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
	Influence of lake level fluctuation on channel and wetland connectivity.	• Potential for either Applewood or Serson Creek and the associated wetlands to become disconnected from the Lake under low Lake Ontario levels. • Potential for outlets to become "perched" under low flow conditions. • Under low lake levels the lake backwater effect will be reduced in the channel and the drop in water level may lead to higher velocities flushing out accumulated sediments.	• Serson and Applewood Creek designs incorporate the anticipated high lake level and the monthly low lake level to produce a profile that will ensure connectivity to Lake Ontario under both high and low Lake Ontario conditions. • Levels at the outlets successfully convey the 5-year flood for each creek at a lake level of 75.4 masl. • The channels are designed to meet the low lake level of 73.75 masl, which should ensure that the creeks do not become 'perched' during low flow conditions.	**Negligible** • Design conditions should ensure connectivity and that Serson and Applewood Creek do not become parched. • Flushing of sediment is likely to be a positive effect of low Lake Ontario levels.
	Potential for sedimentation to affect channel form (including river mouths) and associated vegetation.	• The low supply of fine sediments (very fine sand to small cobble) found in Serson Creek will be easily transported through the system. • Within Applewood Creek: o At lower flows, fines will deposit at locations within the design channels, but shall be remobilized during high flow events; and o Containment of the flows up to the 5-year event further ensure that the design channels move and store sediment regularly.	None	**Negligible** • The relatively low sediment supply to the lake and these design considerations provide a system which can function over time to maintain the conveyance of water and sediment to Lake Ontario
	Qualitative assessments of the adaptability of the wetland function to climate change.	• Larger, more frequent storms have the potential to cause increased discharge into the wetlands. • Potential, but not anticipated drops in the level of Lake Ontario due to climate change could reduce lake levels below the invert levels to the inlets to the wetlands, leaving the constructed wetlands disconnected from the lake.	• Water control gates located at the inlets to the wetlands will allow for the management of water levels within the wetlands as required in the event of water levels that exceed the anticipated range of low water levels.	**Negligible** • Vegetation in the lake-connected wetlands is expected to adapt and thrive based on the optimized frequency and duration of inundation of the lake-connected wetlands. • Water control structures will allow more resilience and control to maintain wetland features.
	Qualitative assessment to determine the ability of river channels and shoreline works to accommodate changes in flow and lake levels due to climate change.	• Larger, more frequent storms have the potential to cause: o increased flooding upstream (or in the WWTF in the case of Serson Creek), and o increased scour of the constructed channels in Serson and Applewood Creeks. • Potential, but not anticipated drops in the level of Lake Ontario due to climate change could reduce lake levels that may improve hydraulic conveyance of Serson and Applewood Creeks, especially Applewood Creek, by increasing the slope of the channel.	None	**Negligible** • Annual variability is expected to result in a balanced system.

7.3.1.3 Summary of: Naturalization Objective

The Naturalization objective for the LWC Project seeks to enhance the quality of the aquatic and terrestrial habitat within the LWC Project Study Area. Included in this is the creation of linkages between habitat along the waterfront and between the waterfront and existing parks and corridors.

In order to assess the effects of the LWC Project with respect to improving aquatic and terrestrial habitat, two criteria and six indicators were evaluated for construction phase effects and three criteria and eleven indicators were evaluated for establishment/post-establishment phase effects.

The aquatic and terrestrial habitat will undergo changes within the LWC Project Study Area along the Lake Ontario shoreline, along the construction access route and within Applewood and Serson Creeks both during and following construction. Table 7.4 provides an overall summary of the net gains and losses with respect to the Naturalization objective of the LWC Project.

Table 7.4 Net Gains and Losses from the LWC Project with respect to the Naturalization Objective

LWC Project Area Feature	LWC Project Losses	LWC Project Gains	Mitigation and Net Effect
Aquatic Habitat – Lake Ontario Shoreline	• Land creation will result in the loss or alteration of 39 ha of open coast aquatic habitat. • Land creation may cause water quality impairment in Lake Ontario due to siltation, release of deleterious substances and entrapment of fish.	• Land creation will result in an increase in the irregularity and diversity of shoreline types including an overall shoreline increase from 1,765 m to 2,880 m and improvement of aquatic habitat especially for early life stages.	**Positive** • Construction best management practices will minimize or eliminate potential water quality issues and fish entrapment effects. • The LWC Project results in an overall net increase in and improvement to Lake Ontario aquatic habitat.
Aquatic Habitat – Serson and Applewood Creeks	• Land creation and Creek improvements may cause water quality impairment in Applewood Creek, Serson Creek due to siltation, release of deleterious substances and entrapment of fish.	• An increase in the amount and overall availability of aquatic habitat in both Serson and Applewood Creeks including better connections with Lake Ontario and incorporation of habitat features such as rocky steps and improved riparian vegetation.	**Positive** • Construction best management practices will minimize or eliminate potential water quality and fish entrapment effects. • The removal of vegetation will be mitigated with overall improvements to the type and variety of riparian vegetation.

Table 7.4 Net Gains and Losses from the LWC Project with respect to the Naturalization Objective (Cont'd)

LWC Project Area Feature	LWC Project Losses	LWC Project Gains	Mitigation and Net Effect
Aquatic Habitat – Serson and Applewood Creeks	• Riparian vegetation removal including the removal of some juvenile trees within the existing stormwater channel of Serson Creek. • Construction may improve opportunities for the establishment of nuisance and invasive species.	• Incorporation of active management of vegetation and fisheries communities in wetlands to deal with fluctuations in lake levels over anticipated future conditions. • Creek design elements will ensure they do not become parched even in low Lake Ontario level conditions.	• Efforts will be made to control the introduction and establishment of nuisance and invasive species. • The LWC Project will create better habitat connections (both aquatic and terrestrial) from Serson and Applewood Creeks to Lake Ontario and upstream. • Design elements such as water control structures will ensure functionality of the system within an anticipated range of Lake Ontario water levels.
Terrestrial Habitat	• Wildlife disruption will occur during construction along construction access route which may also act as a barrier to movement. • Vegetation removal and terrestrial habitat loss is limited to vegetation along the construction access route and riparian habitat along Serson and Applewood Creeks. • Alteration of successional processes on the beach ridge at the mouth of Applewood Creek. • Construction may improve opportunities for the establishment of nuisance and invasive species.	• Creation of 33 ha of terrestrial habitat including meadow, beach, forest, open wetland, treed swamp and rocky island that meets or exceeds all of the LWC Project minimum habitat size objectives. • Creation of habitat linkages between existing and created lands.	**Positive** • The LWC Project will increase both the amount and diversity of terrestrial habitat within the LWC Project Study Area. • Construction effects along the construction access route and Serson and Applewood Creeks will be temporary and, following decommissioning, will result in improved habitat (e.g., for reptiles and amphibians). • The new terrestrial habitat will provide important stepping stone habitat along the Lake Ontario shoreline, especially for migrating species.

Overall, the Preferred Alternative results in net gains in aquatic and terrestrial habitat and the LWC Project meets the Naturalization objective.

Table 7.5 Overall Effects Related to Objective 1

Criteria	*Indicator*	*Overall Effects*
Construction		
Ability of alternative to be self-compensating with respect to fish habitat	Area of aquatic habitat lost or altered (ha).	Negligible
	HAAT model estimates of area requiring compensation (ha).	None
	Potential disruption to fish habitat as a result of land creation activities (siltation, fish removal, etc.	Negligible
Habitat removal or disruption during construction of site access road and laydown area	Area of vegetation removed or disrupted (m^2).	Negligible
	Number of Species at Risk removed/disrupted.	None
	Area of aquatic habitat removed or disrupted (m^2).	Negligible
Establishment/Post-Establishment		
Change in shoreline character	Change in diversity of shoreline types (% increase or % decrease).	Positive
	Quantitative assessment of shoreline irregularity and the ability to provide nearshore habitat.	Positive
Ability to create functional habitat blocks	Area of habitat created (m^2) of wetland, forest, and, meadow.	Positive
	Assessment of improvements to aquatic habitat created and ecological benefits achieved through the changes to Serson and Applewood Creeks.	Positive
	Qualitative assessment of habitat created including benefits created by LWC with respect to filling in missing and/or impaired portions of aquatic and terrestrial ecosystems in this part of the Mississauga waterfront.	Positive
	Qualitative assessment of connectivity between habitats for the movement for wildlife (e.g. mammals, herptofauna, invertebrates, fish, birds, etc.).	Positive
Effects of hydraulics and hydrology / sedimentation on sustainability of wetland communities	Qualitative assessment of ability to manage a full range of flows without adverse impact on wetland communities (high erosional stress, sediment deposits).	Negligible
	Influence of lake level fluctuation on channel and wetland connectivity.	Negligible
	Potential for sedimentation to affect channel form (including river mouths) and associated vegetation.	Negligible
	Qualitative assessments of the adaptability of the wetland function to climate change.	Negligible
	Qualitative assessment to determine the ability of river channels and shoreline works to accommodate changes in flow and lake levels due to climate change.	Negligible
Summary: **Overall, the Preferred Alternative for the LWC Project provides a substantial improvement to natural conditions within the LWC Project Study Area. The loss or alteration of poor quality aquatic habitat is offset by the creation of high quality terrestrial and aquatic habitat, thus, the Preferred Alternative meets the Naturalization objective.**		

7.3.2 Objective 2: Access

7.3.2.1 Construction Effects

Criterion: Potential for change in access to and use of Waterfront Trail during construction

Indicator: Duration and length of trail closed to use

To avoid conflicts between construction vehicles and trail users, the Waterfront Trail will be closed and temporarily relocated to the south side of Lakeshore Road. The length of trail lost was measured in ArcGIS.

During the 7-10 years of construction, approximately 770 m of Waterfront Trail will be affected by construction. During active construction periods, this section of trail will be closed to the public. The affected portion of the Waterfront Trail will be re-opened to the public during non-construction hours and other options to provide temporary access to the shoreline will be explored during detailed design. In addition, a continuous east-west connection of the Waterfront Trail will be maintained throughout the construction period by re-routing the Waterfront Trail along the south side of Lakeshore Road or within the Arsenal Lands. Owing to the continued access through the area by implementing the proposed mitigation measures, effects are deemed to be negligible.

Indicator: Potential for signalization of trail crossing with construction vehicles

This indicator was assessed by evaluating proposed crossing points between the preferred construction access road and the Waterfront Trail.

The preferred access road will only cross the re-routed Waterfront Trail at one intersection, which already has a signal. However, the entrance to this access route will not become available until 2015 which will necessitate using an entrance point to the east for approximately the first year of construction. Currently, there is no signalization at this proposed entrance point so signage will be required to alert trail users to the presence of turning construction vehicles. Once the preferred entrance becomes available in 2015, no effects are expected due to the presence of an existing signal and entrance (Figure 7.1).

Summary of: Potential for change in access to and use of Waterfront Trail during construction during construction, a 770 m length of the Waterfront Trail will be closed to the public; however, a continuous east-west connection across the LWC Project Study Area will be maintained and the construction access road will be made available to the public during non-construction hours. Safety will be maintained owing to the existing signal at the point where the Waterfront Trail and the preferred construction access road entrance will cross. The temporary entrance that will be

used until approximately 2015 will include signage along the trail to mitigate potential conflicts between trail users and construction vehicles.

Figure 7.1 Construction Access and Waterfront Trail Re-Routing

Criterion: Potential for change to use and enjoyment of park areas including Waterfront Trail during construction

Indicator: Potential for dust, vehicle emissions and noise to affect park and Waterfront Trail use and enjoyment

The LWC Project footprint and construction access route is located within or adjacent to parts of Marie Curtis Park and the Waterfront Trail. This indicator identifies potential negative effects related to the generation of dust, vehicle emissions and noise to users of Marie Curtis Park and/or the Waterfront Trail in proximity to the construction site. This indicator was assessed based on professional experience with similar land creation projects on Lake Ontario.

Construction of the LWC Project will result in typical atmospheric emissions associated with a land creation project including dust generation from the transport and placement of fill, combustion emissions from construction equipment and other nuisance effects associated with construction noise. These effects are short-term (during active construction) and infrequent (during certain times of the day), and are limited to within the LWC Project Study Area. Users of Marie Curtis Park and the Waterfront Trail in proximity to the LWC Project will experience some nuisance effects related to dust, vehicle emissions and noise that will be localized during construction. Some users of the park may also find the presence of construction activity to be aesthetically unappealing.

Best management practices for dust suppression such as watering of the access road during dry periods and speed limits on the access road will be employed. Vehicles and other construction equipment will be well maintained to minimize emissions and vehicles will be equipped with mufflers to minimize noise from equipment. Where possible, opportunities to minimize noise associated with construction vehicles backing up could be implemented. All construction activities will adhere to the City of Mississauga's Noise Control By-Law 360-79. As a result, overall net effects are expected to be negligible.

Indicator: Potential for changes in ability to access and use park during construction due to traffic congestion and or changes to access

Construction activity has the potential to create conflicts and/or restrictions for the public and local park users. This indicator was assessed to identify potential negative impacts to users of Marie Curtis Park related to traffic congestion or changes to access resulting from construction. This indicator was assessed by modeling traffic conditions along construction routes such as Lakeshore Road based on current conditions combined with anticipated construction traffic associated with the LWC Project.

The traffic analysis conducted for the LWC Project indicates that baseline traffic conditions at most intersections is congested. Traffic generated by construction of the LWC Project will result in an increase in traffic of 0.5% to 3.5% at various intersections during peak periods which will have a negligible impact on existing traffic conditions in the Project and Regional Study Areas.

During the 7-10 years of construction, visitors to Marie Curtis will have restricted access to some areas, particularly the western portion of Marie Curtis Park beach. In addition, there is a potential for impairment to the "sense of nature" visitors may feel when the park is not under/adjacent to construction. However, users will retain use of the majority of Marie Curtis Park and the beach east of the construction area and construction hours will be limited to weekdays so that the park is construction free during evenings and weekends.

In addition, a temporary, informal walking path could be established south of the WWTF to allow the public to view construction progress pending further investigation of its feasibility during detailed design. The opportunity to create a path between the southern boundary of the WWTF and the construction area are constrained by slopes, narrow passages, potential public safety issues and security concerns at the WWTF. It is anticipated that the temporary walking path will be mown grass with exclusionary fencing. As such, this temporary path will only be available for walking during daylight hours. Furthermore, concerns about public safety (i.e. isolation, WWTF security, etc.) associated with the temporary path have been raised which will need to be addressed during detailed design. The feasibility of establishing this temporary walking path will be confirmed during detailed design.

Summary of: Potential for change to use and enjoyment of park areas including Waterfront Trail during construction

During construction, dust, noise and vehicle emissions along with construction traffic and restricted access to some areas of Marie Curtis Park will decrease the ability of the public to enjoy the park areas, in particular the Waterfront Trail and the western portion of the Marie Curtis Park beach. However, these effects will be limited to the 7-10 year construction timeframe and mitigation measures such as adherence to the City of Mississauga Noise Control By-Law 360-79 will minimize negative effects. As such, it is expected that overall net effects will be negligible.

Criterion: Potential for displacement of built heritage resources due to construction of access road, laydown area and land creation area

Indicator: Cultural heritage value of built heritage resources and cultural heritage landscapes within land creation area

There are a number of built heritage resources within the LWC Project Study Area, including the Small Arms Building; water tower; a cultural woodlot to the west side of the Small Arms Building; a cultural woodlot to the south of the large meadow; and the rifle shooting range located at 1300 Lakeshore Road on Region of Peel property, south of the Small Arms Building.

Effects on cultural heritage resources are only expected during construction, potentially to the Small Arms Building and the baffles of the rifle shooting range as a result of the proximate location of the construction access road. There is substantial physical separation between the access road and the other heritage features. Potential effects to the Small Arms Building and the baffles of the rifle shooting range can be mitigated through physical separation and buffering of construction activities such as ensuring vehicle access to the construction site is maintained to not compromise the physical separation. Since potential effects can be mitigated, effects on cultural heritage resources are considered negligible.

Summary of: Potential for displacement of built heritage resources due to construction of access road, laydown area and land creation area

Overall, the net effects during construction will be negligible on built heritage resources. Construction traffic will maintain a minimum distance of 5 m from the baffles to mitigate impacts from vibrations and the use of barriers will protect the baffles from physical contact with the truck traffic should an accident occur. Routing construction traffic away from the Small Arms Building should eliminate potential effects from vibrations.

Criterion: Potential effects from construction of access road, laydown area and land creation area on marine and land-based archaeological resources

Indicator: Significance of archaeological resources within footprint of land creation and associated park area

A Stage 1 Archaeological Assessment identified the potential for intact cultural heritage resources to be found along the south side of the Lakeshore Road alignment, as well as along the length of access route between Lakeshore Road and the Waterfront Trail. As the access route is anticipated to be several metres wider than the existing Waterfront Trail, there is the potential for effects on archaeological resources along its length. In addition, the laydown area will be located on the Arsenal Lands parking lot, east of the Small Arms Building.

A subsequent Stage 2 archaeological assessment conducted in June 2013, confirmed that the areas containing the construction access route, laydown area, temporary trail bypass along Lakeshore Road, and channel realignment works for Serson Creek, north of the WWTF were heavily disturbed and contained no cultural or archaeological resources. As such, there are no significant effects associated with land-based archaeological resources.

A marine archaeological assessment completed in 2012 on the in-water portion of the LWC Project Study Area indicated that there are no marine-based archaeological resources within the LWC Project Study Area so there are no potential effects from the LWC Project.

Although the likelihood is small, if artifacts or human remains are found, construction will cease and the Ministry of Tourism, Culture and Sport will be notified. As such, activities will ensure that any artifacts found will not be negatively affected. Given this mitigation measure, potential effects are considered negligible.

Summary of: Potential effects from construction of access road, laydown area and land creation area on marine and land-based archaeological resources

Terrestrial and marine based archaeological assessments determined that the terrestrial based LWC Project Study Area is disturbed and unlikely to contain any artifacts and that there are no marine-based archaeological resources within the footprint of the LWC Project Study Area.

Criterion: Potential for effect from construction of access road, laydown area and land creation area on traditional uses of lands by First Nations and Métis

Indicator: Extent of traditional uses of lands within LWC Project Study Area

The new natural waterfront park must respect and wherever possible enhance traditional uses of lands by First Nations and Métis. Currently the LWC Project Study Area is not used for traditional purposes. As such, there will be no effects to traditional uses associated with the construction period.

Summary of: Extent of traditional uses of lands within LWC Project Study Area

Since the LWC Project Study Area is not currently used by First Nations and Métis, there are no negative effects associated with construction.

Table 7.6 Objective 2: Access (Construction Effects)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
Potential for change in access to and use of Waterfront Trail during construction	Duration and length of trail closed to use	• 770-m of the Waterfront Trail through the Arsenal Lands, will be closed to the public for the duration of the project (approximately 7-10 years).	• A continuous east-west connection of the Waterfront Trail will be maintained by temporarily re-routing the existing Waterfront Trail along the south side of Lakeshore Road. • Public access along the temporary construction road will also be allowed during non-construction hours. • Additional opportunities to provide temporary public access to the shoreline will also be explored including a temporary viewing trail.	**Negligible** • Although trail use is disrupted, an east-west connection will be maintained, public access will be allowed along the temporary construction road during non-construction hours and other opportunities to allow access to the shoreline will be explored.
	Potential for signalization of trail crossing with construction vehicles.	• The preferred construction access route will only cross the re-routed Waterfront Trail once at a signalized intersection, so no additional signalization is anticipated once the entrance becomes available in 2015. • For the first year of construction, an entrance point to the east of the preferred location will be used where there is currently no signalization.	• Signage will be posted where the Waterfront Trail crosses the temporary access entrance to alert trail users to the presence of turning construction vehicles.	**None** • Truck traffic crosses the Waterfront Trail at a signalized intersection and no additional signalization is anticipated.
Potential for change to use and enjoyment of park areas including Waterfront Trail during construction	Potential for dust and vehicle emissions and noise to affect Waterfront Trail use and enjoyment.	• Construction activity will create nuisance effects related to dust, vehicle emissions and noise for park and Waterfront Trail users in areas adjacent to the active construction site. • Effects will be localized and limited to active construction periods.	• Best management practices will be employed for dust (e.g., watering of access roads during dry periods), emissions (e.g., well maintained equipment) and noise (e.g., mufflers on construction equipment). • Adhere to City of Mississauga Noise Control By-Law 360-79. • Opportunities to minimize noise associated with trucks reversing out of the site will be explored.	**Negligible** • With the use of best management practices, the net effects to park and trail users are limited to active construction times and are similar to common effects from urban construction projects.
	Potential for changes in ability to access and use park during construction due to traffic congestion and or changes to access.	• Traffic conditions on the surrounding roadways will experience minimal increases in traffic volumes during construction. Traffic analysis indicates a 0.5% to 3.5% increase in traffic at various intersections during peak hours. • Construction vehicles will not be using the public parking areas so there will be no effect on current parking conditions. • Public access to the western extent of the Marie Curtis Park beach will be limited during construction activities to accommodate the access road and construction activities. • Restricted public access to the construction site will result in reduced length of beach available for recreational activities. • Active construction may also result in an impairment of the “sense of nature” feeling when using the western beach of Marie Curtis Park.	• Potential conflicts with construction vehicles and activities will be mitigated through restricted public access to the construction site along the western portion of the park. • Users will continue to retain use of the majority of Marie Curtis Park West and the beach. • Construction hours will be limited to weekdays to provide opportunities for the “sense of nature” feeling during the evening and weekends. • A temporary viewing trail to the south of the WWTF could be established during construction.	**Negligible** • Reduced access is not anticipated to affect the user’s enjoyment of the area because high use areas are not affected. • Reduced access will be limited to the western portion of the site and construction will be limited to weekday, daytime hours. • Effects will be temporary. • There will be no substantial change in traffic conditions by adding LWC construction related traffic to background conditions.

Table 7.6 Objective 2: Access (Construction Effects) (Cont'd)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
Potential for displacement of built heritage resources due to construction of access road, laydown area and land creation area	Cultural heritage value of built heritage resources and cultural heritage landscapes within land creation area.	• No displacement of built heritage resources. • No effects on the following built heritage resources, which are avoided by the construction access route: o Cultural woodlot located south of the Arsenal Lands meadow; o Cultural woodlot to the west of the Small Arms Building; and o Water tower. • Potential effects from the construction access route on the: o Small Arms Building; and o Baffles of the rifle shooting range.	• Disturbances will be mitigated through: o physical separation, o buffering, and o maintenance of vehicular access.	**None** • Potential effects are mitigated.
Potential effects from construction of access road, laydown area and land creation area on marine- and land-based archaeological resources	Significance of archaeological resources within footprint of land creation and associated park area.	• A Stage 2 Archaeological Assessment conducted in June 2013 confirmed that the construction access route, laydown area, and temporary trail bypass along Lakeshore Road were heavily disturbed and unlikely to contain cultural or archaeological resources. There are no marine-based archaeological resources within the LWC Project Study Area.	• Should artifacts or human remains be found during construction, construction will cease and the Ministry of Tourism, Culture and Sport notified.	**Negligible** • Although likelihood is small, if artifacts or human remains are found, mitigation measures will ensure effects are negligible.
Potential for effect from construction of access road, laydown area and land creation area on traditional uses of lands by First Nations and Métis	Extent of traditional uses of lands within LWC Project Study Area.	• The lands in the LWC Project Study Area are not currently used by First Nations or Metis communities for traditional purposes or others.	• None.	**None** • There is currently no traditional land uses within the LWC Project Study Area.

7.3.2.2 Establishment/Post-Establishment Effects

Criterion: Potential for Lookout Areas

Indicator: Number of opportunities for views and character of views from the LWC Project to Lake Ontario, OPG's Lakeview site to Lake Ontario and back to the cities of Mississauga and Toronto and from the Lake Ontario onshore

The provision of views along the shoreline and from the shoreline and adjacent areas are an important feature in enhancing public enjoyment of the waterfront. This indicator was qualitatively assessed based on expected changes along the waterfront from establishment of the LWC Project.

No prominent lookout areas towards Lake Ontario will be affected. Views from the lake toward the LWC Project Study Area are not currently highly valued and the establishment of naturalized habitat and promontories as part of the LWC Project will better hide the WWTF, improving views from the lake. There will be a number of new opportunities for improved views of Lake Ontario, the created wetlands and other created terrestrial and aquatic landforms including new views towards the cities of Mississauga and Toronto. In fact, the new landforms were designed to provide prominent viewsheds wherever possible. These new opportunities will create a positive net effect of the LWC Project.

Summary of: Potential for Lookout Areas

The creation of new opportunities for viewing improved natural and built features will result in a positive benefit to users of the LWC Project, the Waterfront Trail, boaters on Lake Ontario and Marie Curtis Park users.

Criterion: Potential for changes to use of waterfront for recreation

Indicator: Potential for changes to water quality at Marie Curtis Park beach west with respect to swimming

Land creation activities have limited potential to affect local circulation patterns at Marie Curtis Park beach west. Potential effects were assessed using a lake water quality model.

The water quality modeling concludes that there is no significant change in water quality at Marie Curtis Park West Beach as a result of the LWC Project. Modeling indicates that total phosphorous levels may improve slightly following construction of the islands. Based on these results, the implementation of the LWC Project will have a negligible effect on the water quality at Marie Curtis Park beach for recreational purposes.

Indicator: Potential for changes to existing recreational activities on the sand beach at Marie Curtis Park west

Land creation activities have the potential to change the recreational opportunities at Marie Curtis Park west's existing sand beach. Changes to the sand beach could affect the recreational experience of current beach users. Potential effects are assessed using professional judgment.

Some members of the public have indicated a preference for walking and sitting on sand beaches (compared to cobble beaches) and the proposed changes will reduce or alter the amount of publically accessible sand beach at the water's edge at Marie Curtis Park west by approximately 235 m. The LWC Project Preferred Alternative has been refined to minimize encroachment on Marie Curtis Park west beach while still meeting the LWC Project objectives. Further opportunities to minimize encroachment will be explored during detailed design. The loss of existing sand beach at the water's edge is mitigated by providing significantly more access to the water by creating over 1110 m of new cobble beach with smaller grain sizes (sand/gravel) occurring for the first 50 m west of the groyne. Therefore, the implementation of the LWC Project will have a negligible effect on existing recreational activities on the sand beach at Marie Curtis Park west.

Indicator: Potential for changes to use for windsurfers and/or kiteboarders

Land creation activities have the potential to affect the use of existing beaches and nearshore areas by windsurfers and/or kiteboarders. Shoreline orientation and the presence of landforms will influence how windsurfers and/or kiteboarders use the area. Potential effects to these users are assessed using professional judgment.

The orientation of the existing shoreline will change and new landforms will be present with the implementation of the LWC Project. These changes will require windsurfers and kiteboardsers to adapt to the new shoreline configuration and presence of new landforms. To mitigate effects to these users, navigation maps will be updated based on the new shoreline configuration so lake users are aware of any new potential hazards. As indicated in Chapter 3, Marie Curtis Park is recommended for experienced riders only due to the prevalent wave and wind conditions. Once windsurfers and kiteboardsers adapt to the new shoreline configuration, they should be able to continue to use Marie Curtis Park as a launching point for their activities. Since windsurfers and kiteboarders will be able to continue using the beaches, the net effect to these users is considered negligible.

Summary of: Potential for changes to use of waterfront for recreation

Lake modeling indicates that, following construction, water quality at Marie Curtis Park beach west for recreational activities is expected to be similar to existing conditions. A portion of the sand beach at Marie Curtis Park west will be altered which will change the way some recreational users experience the site.

Criterion: Potential for public access to water's edge

Indicator: Percentage of accessible water's edge

Ease of regular access to the water's edge will enhance public enjoyment of the waterfront, and facilitate a variety of uses. The accessible water's edge was evaluated both qualitatively and quantitatively. Quantitatively, pre-construction shoreline lengths were measured from geo-referenced aerial imagery using ArcGIS and post construction shoreline lengths were measured from the LWC Project Grading Plan (2013).

- Currently, the area of Marie Curtis Park west that is affected by the LWC Project has 235 m of publically accessible beach. The remaining 270 m of publically accessible sand beach extending to Etobicoke Creek at Marie Curtis Park west will remain unaffected by the LWC Project. Following implementation of the LWC Project, the length of publically accessible beach will increase to 1,110 m which includes 795 m of cobble, 265 m of gravel/cobble and 50 m of sandy/gravel that will be mostly sandy during the summer and be similar to existing conditions. In addition, the 235 m of publically accessible sand beach that is affected by the LWC Project will remain accessible behind the created land. During detailed design, opportunities to provide controlled access to wetlands and creeks will be investigated. In summary, the LWC Project will result in the following trade-off in public access to the water's edge:235 m of publically accessible sand beach will be transformed (will remain behind the new land creation); and
- 1,110 m of new beach created consisting of:
    - 795 m of cobble beach;
    - 265 m of gravel/cobble beach; and
    - 50 m of gravel/sand beach.

While the LWC Project will result in a net loss in sandy/gravel beach, the LWC Project will provide a substantial increase in overall beach (predominantly cobble) and a much more accessible water's edge including improved opportunities for fishing, bird watching and nature appreciation. In addition, the Marie Curtis Park beach that is east of the LWC Project groyne structure (see Figure 6.1) will remain. The net increase in accessible beach will result in a positive effect.

Indicator: Potential to create tiered trail system providing seasonal access

Currently the Waterfront Trail is forced to bypass much of the actual waterfront within the LWC Project Study Area. For this indicator, a qualitative assessment of the connection that will be provided by the new route for the Waterfront Trail following construction was evaluated.

The lands created for the LWC Project will allow for a multi-use connection of the Waterfront Trail that traverses across the Project Study Area and provides a linkage between the OPG Lakeview site and Marie Curtis Park along the waterfront. This new trail connection will create a positive effect by allowing for a waterfront connection across the LWC Project Study Area. The existing Waterfront Trail alignment will also be maintained providing multiple trail alignments through the Project Study Area upon establishment of the LWC Project.

Indicator: Potential to create multi-use trail connection across area of land creation

Currently the Waterfront Trail is forced to bypass much of the actual waterfront within the LWC Project Study Area. For this indicator, a qualitative assessment of the connection that will be provided by the new route for the Waterfront Trail following construction was evaluated.

The lands created for the LWC Project will allow for a multi-use connection of the Waterfront Trail that traverses across the Project Study Area and provides a linkage between the OPG Lakeview site and Marie Curtis Park along the waterfront. This new trail connection will create a positive effect by allowing for a waterfront connection across the LWC Project Study Area.

Summary of: Potential for public access to water's edge

The LWC Project will result in a Waterfront Trail that allows for improved and additional waterfront access and nature appreciation. Although the LWC Project will result in a net loss of sand beach, there will be a substantial increase of overall beach and improved access to the waterfront. Given the current limited waterfront access and trail connections along the waterfront the overall effect of the LWC Project will be a positive improvement to the current Waterfront Trail and water access.

Criterion: Potential for effect from construction of access road, laydown area and land creation area on traditional uses of lands by First Nations and Métis

Indicator: Extent of traditional uses of lands within LWC Project Study Area

The new natural waterfront park must respect and wherever possible enhance traditional uses of lands by First Nations and Métis. In particular, potential effects during the establishment/post-establishment phase on traditional uses of lands by First Nations and Métis relate to their ability to access and use the land for traditional purposes.

While there are no known culturally significant riparian uses within the LWC Project Study Area, there is the potential to provide opportunities for the collection of materials. In addition, the Mississaugas of the New Credit First Nation indicated that the improved access to the water once the LWC Project is established is viewed as having important cultural significance. These are considered positive effects of the LWC Project on traditional uses of lands by First Nations and Métis.

Summary of: Extent of traditional uses of lands within LWC Project Study Area

Although the LWC Project Study Area is not currently used by First Nations and Métis, the Mississaugas of the New Credit have indicated a strong spiritual connection to water. Improved access to the waterfront will be provided following construction. This is a net positive effect of the LWC Project on the traditional use of the LWC Project Study Area by First Nations and Métis.

Table 7.7 Objective 2: Access (Establishment/Post-Establishment Effects)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
Potential for lookout areas	Number of opportunities for views and character of views from the LWC Project to Lake Ontario, OPG's Lakeview site to Lake Ontario and back to the cities of Mississauga and Toronto and from the Lake Ontario onshore	• New views will be created with the creation of the landform, both from onshore areas to Lake Ontario and from Lake Ontario to inland, including: o views downstream Serson Creek to Lake Ontario; o from on the promontory of land back to the City of Toronto skyline; and o views into and out of wetland areas have been created. • Landforms have been designed with views in mind to ensure prominent viewsheds are created wherever possible. • Views from the lake will be improved since the new landform will reduce prominence of the WWTF.	None	**Positive** • Views to OPG's Lakeview site and the WWTF are not currently of high aesthetic value. • New lookout opportunities will have been created where there were none before.
Potential for changes to use of waterfront for recreation	Potential for changes to water quality at Marie Curtis Park beach west with respect to swimming	• The water quality modeling concludes that there is no significant change in water quality at Marie Curtis Park West Beach as a result of the LWC Project.	None	**Negligible** • There are no significant impacts from the LWC land creation area on water quality at the Marie Curtis Park beaches.
	Potential for changes to existing recreational activities on the sand beach at Marie Curtis Park west	• The LWC Project Preferred Alternative will affect approximately 235 m of publically accessible sand beach at Marie Curtis Park west. • The existing sand beach area will remain intact behind a new shoreline that includes a mix of gravel/cobble beach. • The public has indicated a preference for walking and sitting on sand beaches and the proposed changes will reduce the amount of sand beach at the water's edge. • Overall, the Preferred Alternative will provide significantly more accessible water's edge for recreation compared to current conditions.	• The LWC Project Preferred Alternative has been refined to minimize encroachment on Marie Curtis Park west beach while still meeting the LWC Project objectives. • Further opportunities to minimize encroachment while still meeting the LWC Project objectives will be explored during detailed design. • The loss of existing sand beach at the water's edge is mitigated by providing significantly more access to the water by the LWC Project.	**Negligible** • Based on the provision of substantially more accessible waterfront beach, and the retention of the majority of Marie Curtis Park west's sand beach, there will not be a substantial effect on existing recreational uses.
	Potential for changes to use for windsurfers and/or kiteboarders	• The orientation of the existing shoreline will change which will require windsurfers and kiteboardsers to adapt to the new shoreline configuration. • The new shoreline configuration may change the conditions under which these users access the lake due to new potential hazards (e.g. rocky islands).	• Navigation maps will be updated based on the new shoreline configuration so lake users are aware of any new potential hazards. • Signage, including maps, will be posted at Marie Curtis Park indicating the new shoreline features including islands.	**Negligible** • The new shoreline configuration will change the way windsurfers and kiteboarders currently use the beach. These users will need to adapt their use patterns to adjust to the new shoreline configuration.

Table 7.7 Objective 2: Access (Establishment/Post-Establishment Effects) (Cont'd)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
Potential for public access to water's edge	Percentage of accessible water's edge	• The current 235 m of publically accessible sand beach will increase to 1,110 m of publically accessible beach including: o 795 m of cobble beach; o 265 m of gravel/cobble beach; and o 50 m of sandy/gravel beach. • In addition, 264 m of currently accessible sand beach will remain behind the land creation area for public use. • Net loss of sand and sand/gravel beach. • The LWC Project results in improved access to the water and waterfront and improved opportunities for fishing, bird watching, and nature appreciation.	• None	**Positive** • There is a net increase in accessible beach shoreline; however a net loss of sand and sand/gravel beach.
	Potential to create tiered trail system providing seasonal access	• Lands created by construction allow for opportunity to create a tiered trail system that will traverse all areas of the site and allow for seasonal use and access. • Improved opportunities for bird watching and nature appreciation. • Multiple trail options will be available since the existing trail will be retained in addition to the new trail(s).	None	**Positive** • The new trails will create improved opportunities for nature appreciation and seasonal use and access.
	Potential to create multi-use trail connection across area of land creation	• Lands created by construction allow for the establishment of a multi-use trail connection across the site, linking to the OPG Lakeview site to the west and Marie Curtis Park to the east.	None	**Positive** • A new multi-use trail connection will have been created where there were none before.
Potential for effect from construction of access road, laydown area and land creation area on traditional uses of lands by First Nations and Métis	Extent of traditional uses of lands within LWC Project Study Area	• Potential to provide opportunities for the collection of medicinal plants and ceremonial activities. • Improved access to the water.	None.	**Positive** The LWC Project will provide future opportunities for traditional activities and improved access to the water.

7.3.2.3 Summary of the Access Objective

The Access objective for the LWC Project seeks to create safe and accessible public linkages along the waterfront in the LWC Project Study Area. These linkages, including the Waterfront Trail, will allow for compatible recreational, educational and cultural heritage opportunities.

In order to assess the effects of the LWC Project with respect to improving public linkages along the waterfront, five criteria and seven indicators were evaluated for construction phase effects and three criteria and seven indicators were evaluated for establishment/post-establishment phase effects.

During construction, access to the waterfront in the LWC Project Study Area will be affected by construction and the closure and re-routing of 770 m of Waterfront Trail; however, following construction, the new Waterfront Trail will offer a trail that provides both vertical relief that will enhance views and enjoyment as well as waterfront access along the entire LWC Project Study Area shoreline.

Marie Curtis Park users may experience nuisance effects from construction such as noise, dust, vehicle emissions and increased traffic. However, effects will be temporary and overall park enjoyment is expected to increase following full build-out of the LWC Project due to access improvements.

While the LWC Project will result in a net loss of sandy/gravel beach within the LWC Project Study Area, following construction, the LWC Project will offer:

- 1,110 m of publically accessible beach and the retention of 235 m of sand behind the created land;
- New views from the created landform to Lake Ontario and back towards Marie Curtis Park, Serson Creek and the cities of Mississauga and Toronto;
- A Waterfront Trail that connects through the LWC Project Study Area via the waterfront; and
- Greater access to the waterfront including for traditional use by First Nations and Métis.

There are no expected effects related to built or cultural heritage resources or marine archaeological resources related to construction or establishment/post-establishment.

Overall, the Preferred Alternative creates linkages that will allow for compatible recreational, educational and cultural heritage opportunities. As such, the Preferred Alternative meets the Access objective of the LWC Project.

Table 7.8 Overall Effects Related to Objective 2

Criteria	*Indicator*	*Overall Effects*
Construction		
Potential for change in access to and use of Waterfront Trail during construction	Duration and length of trail closed to use	Negligible
	Potential for signalization of trail crossing with construction vehicles.	None
Potential for change to use and enjoyment of park areas including Waterfront Trail during construction	Potential for dust and vehicle emissions and noise to affect Waterfront Trail use and enjoyment	Negligible
	Potential for changes in ability to access and use park during construction due to traffic congestion and or changes to access	Negligible
Potential for displacement of built heritage resources due to construction of access road, laydown area and land creation area	Cultural heritage value of built heritage resources and cultural heritage landscapes within land creation area	None
Potential effects from construction of access road, laydown area and land creation area on marine- and land-based archaeological resources	Significance of archaeological resources within footprint of land creation and associated park area	Negligible
Potential for effect from construction of access road, laydown area and land creation area on traditional uses of lands by First Nations and Métis	Extent of traditional uses of lands within LWC Project Study Area	None
Establishment/Post-Establishment		
Potential for lookout areas	Number of opportunities for views and character of views from the LWC Project to Lake Ontario, OPG's Lakeview site to Lake Ontario and back to the cities of Mississauga and Toronto and from the Lake Ontario onshore	Positive
Potential for changes to use of waterfront for recreation	Potential for changes to water quality at Marie Curtis Beach West with respect to swimming	Negligible
	Potential for changes to existing recreational activities on the sand beach at Marie Curtis Park west	Negligible
	Potential for changes to use for windsurfers and/or kiteboarders	Negligible
Potential for public access to water's edge	Percentage of accessible water's edge	Positive
	Potential to create tiered trail system providing seasonal access	Positive
	Potential to create multi-use trail connection across area of land creation	Positive
Summary: **Construction of the LWC Project will result in some disruptions to Waterfront Trail and Marie Curtis Park users due to alternations to Waterfront Trail access and construction activity. There will also be a net loss in existing sand beach at the water's edge following construction. These effects are offset by a substantial net gain in beach access and access to the water's edge plus a continuous Waterfront Trail connection through the new landform where no water access is currently available. Overall, the Preferred Alternative for the LWC Project meets the Access objective.**		

7.3.3 Objective 3: Compatibility

7.3.3.1 Construction Effects

Criterion: Potential for construction traffic to affect traffic volumes on arterial roads and access and egress from arterial roads

Indicator: Additional vehicle traffic on arterial roads resulting from construction

Construction traffic associated with the LWC Project has the potential to create or compound congestion issues on arterial roads (including access and egress). This indicator was assessed to determine how LWC Project related construction traffic will affect current traffic conditions on arterial roads. In order to assess this indicator, traffic conditions were modeled along construction routes and key intersections within the LWC Regional Study Area based on current conditions and combined with anticipated construction traffic associated with the LWC Project.

The traffic analysis conducted for the LWC Project indicates that baseline traffic conditions at most intersections is congested. At peak times, LWC Project related construction traffic is estimated to be in the order of 72 vehicles per hour. Traffic generated by construction of the LWC Project was found to be minimal and would have a negligible impact on existing traffic conditions in the LWC Project and Regional Study Areas. No mitigation measures are proposed for this indicator.

Summary of: Potential for construction traffic to affect traffic volumes on arterial roads and access and egress from arterial roads

Negligible effects on traffic are expected during construction since the LWC Project will add only minimal traffic volumes to current levels.

Criterion: Potential for construction traffic volumes to require changes to intersections

Indicator: Number of intersections requiring changes to facilitate LWC related construction traffic

Increases in traffic volumes associated with LWC Project construction could require changes to intersections to address traffic issues. This indicator was assessed to identify the number of intersections that may require changes due to LWC Project construction related traffic. This indicator was assessed by modeling traffic conditions at key intersections within the LWC Regional Study Area based on current conditions combined with anticipated construction traffic associated with the LWC Project.

Traffic conditions at most intersections within the LWC Project Regional Study Area are congested. Traffic volumes associated with the LWC Project will result in a minor increase in volume at affected intersections. The preferred access point at Lakeshore and Dixie is a

controlled intersection so no physical changes to intersection is proposed. The traffic analysis indicates that current traffic conditions at several intersections could be improved through adjustments to signal timing; however, this would need to be undertaken by the City of Mississauga and the City of Toronto. If the preferred access point is unavailable due to activities related to the Hanlan Feeder Main Project in the early stages of construction, an alternate temporary access point to the east is proposed until the preferred access point becomes available. During detailed design, the LWC Project team will explore options to mitigate traffic effects at the intersection of Lakeshore Road and the temporary construction access route through the establishment of a right hand turn lane and a merge lane exiting the site. The traffic study undertaken for this EA will be made available to the City of Mississauga to allow their traffic planning team to determine if changes to signal timing within the Regional Study Area are appropriate. No further mitigation measures are proposed for this indicator.

Summary of: Potential for construction traffic volumes to require changes to intersections

No net effects are predicted since no intersections will require physical changes.

Criterion: Potential to affect operations at WWTF

Indicator: Changes in access to outfall during construction

The outfall pipe from the WWTF extends into Lake Ontario where it discharges. There are a number of access points to allow for maintenance along the outfall pipe. This indicator was assessed to determine the effects of construction of the Preferred Alternative on access to the outfall pipe. The effects assessment was conducted by overlaying the locations of the access points on the Preferred Alternative footprint using ArcGIS tools.

Construction of the Preferred Alternative results in two of the WWTF outfall access points being affected by the land creation area. During construction there will likely be times when these outfall access points will be inaccessible, however maintenance can be conducted at any of the unaffected access points. The overall net effect of decreased access to the two access points is deemed to be negligible during construction.

Summary of: Potential to affect operations at WWTF

Negligible effects on WWTF operations are expected during construction since access to the outfall will be available at unaffected access points.

Criterion: Potential for effects to water quality at Water Treatment Plant intakes

Indicator: Potential for effects during construction

Land creation construction activities have the potential to release high sediment loads into the lake, potentially affecting water quality at the Water Treatment Plant intakes. Assessment of this

indicator was completed qualitatively based on experience with similar land creation projects and professional judgment.

In order to mitigate the potential to release high sediment loads into the lake, best management practices related to general in-water works will be followed and the "Fill Quality Guide and Good Management Practices for Shore Infilling in Ontario" (MOE 2011) will be met. Soil placement will follow the confined filling technique which involves the creation of brick rubble and concrete confining structures prior to soil placement. The creation of the confining structures will be highly effective at mitigating sediment release to the open water, and more specifically to the water intakes associated with the treatment plant. Overall, effects during construction on water quality at the Water Treatment Plant are expected to be negligible.

Summary of: Potential for effects to water quality at Water Treatment Plant intakes

Although there is some potential for water quality effects during construction due to in-water work and turbidity, best management practices are expected to fully mitigate these potential effects.

Table 7.9 Objective 3: Compatibility (Construction Effects)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
Potential for construction traffic to affect traffic volumes on arterial roads and access and egress from arterial roads	Additional vehicle traffic on arterial roads resulting from construction vehicle movements	• Site generated construction traffic is minor in the range of 72 vehicles per hour during peak hours which has a minor effect on current traffic conditions on arterial roads.	• Recommendations in the traffic study to alter signal timing to improve traffic flow will be provided to the City of Mississauga for consideration.	**Negligible** • Minor increases in traffic volumes during construction will not be noticeably different than current traffic conditions.
Potential for construction traffic volumes to require changes to intersections	Number of intersections requiring changes to facilitate LWC related construction traffic	• Site generated construction traffic is considered minor and will not require any changes to intersections. • The preferred site access road entrance occurs at a currently controlled intersection (Dixie Road). • A temporary access point to the east may be required during early stages of construction which is an uncontrolled intersection and could cause traffic disruptions on Lakeshore related to turning vehicles.	• Options for installing a right hand turn lane and merge lane at the temporary access point will be explored during detailed design.	**Negligible** • Effects to intersections can be mitigated by installing appropriate turn lanes.
Potential to affect operations at WWTF	Changes in access to outfall during construction	• The land creation area covers two existing access points for the WWTF outfall pipe. • During construction, access to these two points along the outfall for maintenance will be disrupted, likely making them inaccessible at times.	• Construction crews will coordinate access requirements with WWTF staff to ensure maintenance needs can be met throughout the construction period.	**Negligible** • There will be some disruption to these two access points during construction, but all other access points along the outfall will be accessible.
Potential for effects to water quality at Water Treatment Plant intakes	Potential for effects during construction	• Potential for effects related to high sediment loads and placement of berm and fill materials.	• Best management practices and mitigation measures will include: o sediment and erosion control; o creation of containment berms to isolate fill operations; and o "Fill Quality Guide and Good Management Practices for Shore Infilling in Ontario" (MOE 2011) will be met.	**Negligible** • Best management practices and testing are expected to control potential effects.

7.3.3.2 Establishment/Post-Establishment Effects

Potential to affect operations at WWTF

Indicator: Changes in access to outfall during establishment/post-establishment.

As stated previously, the WWTF outfall pipe extends into Lake Ontario. Along this pipe, a number of access points allow for maintenance. This indicator was assessed to determine the potential effects of the Preferred Alternative on access to the outfall pipe once the LWC Project is established. The effects assessment was conducted by overlaying the locations of the access points on the Preferred Alternative footprint using ArcGIS tools.

The Preferred Alternative results in two of the WWTF outfall access points being affected by the land creation area. If left un-mitigated, this would result in these two access points being inaccessible once the LWC Project is established. During construction, manhole collar extensions will be installed on each of the affected access points bringing them to the surface of the land creation area so maintenance crews at the WWTF will continue to have access during the establishment/post-establishment phase. As such, following construction, there will be no net effect on access to the outfall pipe.

Summary of: Potential to affect operations at WWTF

No effects on WWTF operations are expected following construction.

Criterion: Potential for effects to water quality at Water Treatment Plant intakes

Indicator: Potential for effects during establishment/post-establishment

The land creation area has the potential to change regional water circulation patterns, potentially affecting the water quality at the Water Treatment Plant intakes. Assessment of this indicator was completed both qualitative and quantitatively by modeling lake circulation during establishment/post-establishment and professional judgment.

Regional water circulation modeling (MIKE-3 Model) was undertaken to assess the potential impact of the new land creation area on the Water Treatment Plant intakes. Results from the modeling indicate that the water quality parameters at the intake either improved or stayed the same during the establishment/post-establishment phase of the LWC Project. As such, no mitigation measures are proposed since effects on water quality are positive.

Summary of: Potential for effects to water quality at Water Treatment Plant intakes

Following construction, water circulation modeling results indicate that water quality at the Water Treatment Plant intakes will either stay the same or improve.

Criterion: Changes to site security for WWTF

Indicator: Ability to maintain/enhance site security for the WWTF

The current WWTF fence line along the shore of Lake Ontario is relatively inaccessible to the public, thus serving a security function limiting access to the WWTF. Early in the planning process for the LWC Project, increased public access resulting from land creation in this area was raised as a potential security concern at the WWTF.

A number of ecological building blocks were being considered for the naturalization component of the LWC Project, and the placement of different building blocks in front of the WWTF was considered based on their potential to discourage public access (e.g. meadow is more conducive to public access than wetland). To mitigate security concerns at the WWTF, the design team determined that placing a treed swamp and wetlands along the current WWTF fence line where it currently borders Lake Ontario would provide a sufficient deterrent to public access. Placing the treed swamp in this location would effectively maintain or enhance site security for the WWTF during the establishment/post-establishment phase. The addition of the steep side of the promontory located between the two proposed wetlands facing the WWTF provides an added deterrent relating to terrain. These design features will maintain site security at similar levels to current, creating a negligible effect.

Summary of: Changes to site security for WWTF

Despite the new land that will be created between the WWTF and Lake Ontario, design features will maintain similar security levels to the current situation. As such, the overall change to site security for the WWTF from the LWC Project is negligible.

Criterion: Changes to parking capacity

Indicator: Potential to affect existing parking capacity at Marie Curtis Park and adjacent areas

The LWC Project will result in increased user access to the area which will create additional pressure on existing parking availability. As part of the Traffic Analysis (Appendix L) conducted for the LWC Project, a parking analysis was completed to determine the effects on existing parking availability. Future parking requirements were determined based on the Institute of Transportation Engineers parking generation guidelines.

The parking analysis indicates that the LWC Project will generate an additional 66 parked vehicles on a typical Saturday afternoon. There are currently 1,000 available parking spaces in the vicinity of the LWC Project which includes capacity at Lakefront Promenade. On a typical Saturday afternoon, approximately 600 of these spaces are occupied leaving 400 spaces available to accommodate additional vehicles generated by the LWC Project.

The preferred parking lots for users of the LWC Project will be in the lots at Marie Curtis Park where there are currently 150 spaces. The current parking demand within these lots on a typical Saturday afternoon is 95 spaces. The addition of 66 vehicles associated with the LWC Project would put these lots over capacity by approximately 11 vehicles. There are an additional 15 street parking spaces available along Lakeshore Road that could accommodate the parking overflow. The City of Toronto has indicated that existing demand for parking spaces at Marie Curtis Park may be greater than this analysis suggests as a result of recent changes to the park. CVC and the Region of Peel will be working with the City of Mississauga and TRCA to plan for additional parking as part of the planning for the Arsenal Lands and Inspiration Lakeview. Parking cannot be provided on the created land area.

It is recognized that the LWC Project will further constrain existing parking capacity issues at Marie Curtis Park. There is no opportunity to create additional parking capacity as part of the LWC Project, so the LWC planning team will continue to support planning initiatives for Inspiration Lakeview and the Arsenal Lands that could include additional parking facilities and alleviate parking constraints in the Project Study Area. Although it is anticipated that parking issues can be addressed as part of adjacent planning initiatives, constraints on existing parking is considered a negative effect.

Summary of: Potential to affect existing parking capacity at Marie Curtis Park and adjacent areas

The establishment of the LWC Project could put existing parking at or over capacity within Marie Curtis Park. Opportunities to alleviate parking constraints will be explored through adjacent planning initiatives; however, the effect on parking is considered a negative effect.

Table 7.10 Objective 3: Compatibility (Establishment/Post-Establishment Effects)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
Potential to affect operations at WWTF	Changes in access to outfall during establishment/post-establishment.	• Fill material placed on top of two manhole covers will cover access to submerged sewer outfalls for maintenance and operations.	• A manhole collar extension will be installed on the current access locations so access can occur from the land creation area. This will provide continued, long-term access to these points.	**None** • Manhole covers will remain accessible during establishment phase.
Potential for effects to water quality at Water Treatment Plant intakes	Potential for effects during establishment/post-establishment	• Regional water circulation modeling indicates that the land creation results in no change or moderate improvements in water quality at the intakes.	• None	**Positive** • Net improvement to water quality is expected.
Changes to site security for WWTF	Ability to maintain/enhance site security for the WWTF	• Land creation and subsequent increases in public access to areas in front of the WWTF could create security concerns at the WWTF.	• The landscape design has incorporated a treed swamp along the fence line in front of the WWTF to discourage public access.	**Positive** • With the proposed design features, site security at the WWTF will be similar to current conditions.
Changes to parking capacity	Potential to affect existing parking capacity at Marie Curtis Park and adjacent areas	• Parking analysis indicates that the LWC Project will generate an additional 66 vehicles requiring parking on a typical Saturday afternoon. • Parking analysis identified approximately 1000 parking spaces in the vicinity of the LWC, of which 600 are currently occupied on a typical Saturday afternoon. • In the lots closest to the LWC Project there are 150 spaces available with a current demand of 95. • Thus, the LWC Project could put the closest lots over capacity in the future (i.e. 95+66=161 spaces required). • The City of Toronto has indicated that existing demand for parking spaces at Marie Curtis Park may be greater than this analysis suggests as a result of recent changes to the park.	• There is no opportunity to create additional parking capacity as part of the LWC Project. • The LWC planning team will continue to support planning initiatives for Inspiration Lakeview and Arsenal Lands that could include additional parking facilities.	**Negative** • Parking capacity in the area will be constrained by additional demand generated by the LWC Project.

7.3.3.3 Summary of the Compatibility Objective

The Compatibility objective seeks to ensure that the LWC Project is compatible with existing infrastructure such as the WWTF, Water Treatment Plant and associated water intake and outfall structures as well as local traffic. It is critical that the LWC Project not affect the form or function of existing infrastructure.

In order to assess the effects of the LWC Project on this objective, four criteria/indicators were evaluated for construction and three criteria/indicators were evaluated for establishment/post-establishment phase effects.

Current traffic conditions at most intersections within the LWC Project Regional Study Area are congested. At peak times during construction, the LWC Project will add about 72 vehicles per hour resulting in a negligible increase compared to existing conditions. A temporary construction access point to the east of the preferred access at Dixie Road may require upgrades to mitigate potential traffic flow issues during the first year of construction.

The WWTF outfall pipe access points that will be disrupted during construction will be fully mitigated following full build of the LWC Projects resulting in no net effects to the WWTF operations. In addition, although there is some potential for water quality effects at the Water Treatment Plant intakes during construction, water quality is expected to stay the same or improve once the LWC Project is established.

Site security at the WWTF is expected to be maintained because of landscape design elements.

Overall, the Preferred Alternative for the LWC Project will meet the Compatibility objective by causing either no, negligible or positive effects on local infrastructure.

Table 7.11 Overall Effects Related to Objective 3

Criteria	*Indicator*	*Overall Effects*
Construction		
Potential for construction traffic to affect traffic volumes on arterial roads and access and egress from arterial roads	Additional vehicle traffic on arterial roads resulting from construction vehicle movements	Negligible
Potential for construction traffic volumes to require changes to intersections	Number of intersections requiring changes to facilitate LWC related construction traffic	Negligible
Potential to affect operations at WWTF	Changes in access to outfall during construction	Negligible
Potential for effects to water quality at Water Treatment Plant intakes	Potential for effects during construction	Negligible
Establishment/Post-Establishment		
Potential to affect operations at WWTF	Changes in access to outfall during establishment/post-establishment.	None
Potential for effects to water quality at Water Treatment Plant intakes	Potential for effects during establishment/post-establishment	Positive/none
Changes to site security for WWTF	Ability to maintain/enhance site security for the WWTF	Negligible
Changes to parking capacity	Potential to affect existing parking capacity at Marie Curtis Park and adjacent areas	Negative
Summary: **The Preferred Alternative will not result in significant traffic disruptions and will not have an adverse effect on existing infrastructure at the WWTF or Water Treatment Plant. Overall, the Preferred Alternative for the LWC Project meets the Compatibility objective.**		

7.3.4 Objective 4: Coordination

7.3.4.1 Construction Effects

Criterion: Consistency with Marie Curtis Park Revitalization Plan

Indicator: Ability to integrate recreational opportunities and trails between the LWC, Arsenal Lands and Marie Curtis Park

The Marie Curtis Park Revitalization Plan identifies a number of new and enhanced recreational opportunities. The Preferred Alternative was reviewed to ensure consistency with the intent to create linkages between these amenities and the shoreline within the LWC Project Study Area, and thus meet the goals of these Master Plans.

Future plans for the Arsenal Lands have currently been placed on hold to allow works for the LWC Project to proceed. As such, there are currently no impacts on the Arsenal Lands as a result of construction due to the LWC Project. Should the planning process reinitiate during construction, any future planning and implementation activities would take into account the LWC Project Preferred Alternative and construction scheduling. Following construction, decommissioning of the LWC Project construction access road should include rough grading to any proposed future condition within the Arsenal Lands, if timing and opportunity allows. This would result in a net positive effect on the implementation of any future Arsenal Lands plan.

Elements of the Marie Curtis Park Revitalization Plan have been implemented in 2011, 2012 and 2013. The construction access route and construction activity does not impact the works underway involving re-vegetation, construction of the dog off leash area, volleyball court, nor the decommissioning of one of the parking lots. However, the construction access route overlaps with approximately 5 m of the new Waterfront Trail upgrades at the border of the Region of Peel. The Waterfront Trail will be temporarily re-routed, maintaining the east-west connection of the trail. Following construction, the Waterfront Trail will be reconstructed and re-opened to the public.

Summary of: Consistency with Marie Curtis Park Revitalization Plan

The net effects of the LWC Project on the Marie Curtis Park Revitalization Plan are positive. Decommissioning of the access road has the potential to provide for rough grading to potential new Arsenal Lands conditions.

Table 7.12 Objective 4: Coordination (Construction Effects)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
Consistency with Marie Curtis Park Revitalization Plan	Ability to integrate recreational opportunities and trails between the LWC Project, Arsenal Lands and Marie Curtis Park	Arsenal Lands • None, however upon completion of construction, decommissioning of the LWC Project construction access road should include rough grading to any new condition, if timing and opportunity allows. Marie Curtis Park Revitalization Plan • The construction access route overlaps approximately 5 m of the Waterfront Trail upgrades that have already been implemented.	Marie Curtis Park Revitalization Plan • All existing Waterfront Trail that will be affected by the access route will be restored during decommissioning of the access road.	**Positive** • Consideration will be given to how the access road is decommissioned such that it would support future Arsenal Lands planning.

7.3.4.2 Establishment/Post-Establishment Effects

Criterion: Consistency with City of Mississauga Waterfront Parks Strategy (2008)

Indicator: Consistency of alternative with Waterfront Parks Strategy

The Preferred Alternative is reviewed to ensure consistency with the key strategic goals outlined in the Waterfront Parks Strategy. The goals include:

- better integration and connectivity of Waterfront Parks;
- improved connections to Mississauga;
- the introduction of more sustainable elements into the parks; and
- promotion of a stronger relationship between the parks and the existing natural systems.

This indicator was assessed by reviewing the City of Mississauga Waterfront Parks Strategy and doing a qualitative assessment of the Preferred Alternative's consistency with the Waterfront Parks Strategy.

The Waterfront Parks Strategy recommends, in general, that a continuous trail be provided along the entirety of Mississauga's waterfront. With a significant naturalization component that aligns with the goals and improved trail connection along the waterfront, the Preferred Alternative is consistent with the intent of the Waterfront Parks Strategy. By providing a trail that does not jog north to Lakeshore Boulevard, the LWC Project provides an improvement to what was contemplated in the Waterfront Parks Strategy.

Summary of: Consistency with City of Mississauga Waterfront Parks Strategy (2008)

The Preferred Alternative is consistent with the goals of the Mississauga Waterfront Parks Strategy resulting in a net positive effect.

Criterion: Consistency with the Visioning for Inspiration Lakeview

Indicator: Consistency of alternative with Visioning for Inspiration Lakeview

The shoreline and Serson Creek within the LWC Project Study Area was identified as a "Green" area in the Visioning for Inspiration Lakeview. This portion of shoreline was discussed as an area to establish a new continuous waterfront south of the WWTF. This indicator was assessed by reviewing the Visioning for Inspiration Lakeview and doing a qualitative assessment of the Preferred Alternative's consistency with that vision.

The Inspiration Lakeview report calls for a "Green Water's Edge" along the waterfront, to be created as a park south of the WWTF. The report envisions this park area to serve several important functions:

- as the green terminus of a rejuvenated Serson Creek;
- to facilitate views to the lake from the Inspiration Lakeview site;
- to provide passive recreational opportunities; and
- to provide a 'green' water's edge to create new natural heritage and habitat opportunities, including improved marine habitat.

The Preferred Alternative meets all of the objectives identified in the Visioning for Inspiration Lakeview making the LWC Project consistent with that vision and an overall positive effect.

Indicator: Ability to integrate alternative with potential plans for OPG's Lakeview site

The Inspiration Lakeview Vision identifies the LWC Project Study Area as a key area for establishing public linkages. The ability of the Preferred Alternative to integrate with potential plans for OPG's Lakeview site is important in the larger Inspiration Lakeview planning process. This indicator was assessed by reviewing the plans for OPG's Lakeview site and doing a qualitative assessment of the Preferred Alternative's ability to integrate with those plans.

The LWC Project Preferred Alternative includes a trail connection from the west end of Marie Curtis Park to the west side of Serson Creek where it connects to OPG's Lakeview site. Without the LWC Project, there is no opportunity to link the OPG Lakeview site with the trail through Marie Curtis Park along the waterfront. The LWC Project makes this valuable connection possible, making it a key component of the public linkage aspect of the Inspiration Lakeview plans and a net positive effect of the LWC Project.

Summary of: Consistency with the Visioning for Inspiration Lakeview

The Preferred Alternative not only meets all of the objectives of the Visioning for Inspiration Lakeview, it also establishes a key linkage between Marie Curtis Park and OPG's Lakeview site. The Preferred Alternative is consistent with the Visioning for Inspiration Lakeview, a positive effect.

Criterion: Consistency with LOISS

Indicator: Consistency of alternative with priorities identified by LOISS

The Preferred Alternative was reviewed against LOISS background studies to ensure consistency with the priorities identified in LOISS and moves the objectives of LOISS forward. The LOISS background study was reviewed to ensure the refinements were consistent with goals, objectives and priorities set out by LOISS.

Following full implementation of the LWC Project, the Preferred Alternative will be compatible with the priorities identified in the LOISS and will support the function of the bioregional corridor. In addition, the LWC Project supports the goals for restoration of natural ecosystems along the Lake Ontario shoreline including habitat creation.

Summary of: Consistency with LOISS

The Preferred Alternative is both consistent with the LOISS and moves objectives related to natural ecosystems and terrestrial and aquatic habitat forward. As a result, the LWC Project results in a net positive effect with respect to this indicator.

Criterion: Consistency with Lake Ontario Biodiversity Strategy

Indicator: Consistency of alternative with priorities identified by the Lake Ontario Biodiversity Strategy

The Preferred Alternative was reviewed to ensure consistency with the recommendations and targets identified in the Lake Ontario Biodiversity Strategy and to ensure that it helps to meet the objectives of the Strategy.

Following construction, the LWC Project would be consistent with five targets of the Lake Ontario Biodiversity Strategy and consistent with recommendations to protect and restore the health of Lake Ontario. The loss of 166 m of existing sand beach to the wetland that will be associated with Applewood Creek and a section of sand beach in Marie Curtis Park that will become hind beach behind a new gravel beach is mitigated by a net increase in high quality coastal wetland habitats and the establishment of a cobble beach and island system resulting in a positive effect.

Summary of: Consistency with Lake Ontario Biodiversity Strategy

With respect to the Lake Ontario Biodiversity Strategy, the LWC Project will:

- be consistent with the biodiversity targets;
- be consistent with the recommendations to protect and restore the health of Lake Ontario; and
- mitigate the loss of beach habitat with an overall increase in high quality habitat that will increase the diversity of aquatic habitat available in the LWC Project Study Area.

As a result, there is a net positive effect from the LWC Project associated with coordinating with the Lake Ontario Biodiversity Strategy.

Criterion: Consistency with Marie Curtis Park Revitalization Plan

Indicator: Ability to integrate recreational opportunities and trails between the LWC, Arsenal Lands and Marie Curtis Park

The Marie Curtis Park Revitalization Plan identifies a number of new and enhanced recreational opportunities. The Preferred Alternative was reviewed to ensure consistency with the intent to create linkages between these amenities and the shoreline within the LWC Project Study Area, and thus meet the goals of the plan.

Once the LWC Project is established, improved trail connections along the waterfront will support the Marie Curtis Park Revitalization Plan.

Summary of: Consistency with Marie Curtis Park Revitalization Plan

Once established the net effects of the LWC Project on the Marie Curtis Park Revitalization Plan are positive based on improved connections of the Waterfront Trail to and along the waterfront allow for positive coordination with the Marie Curtis Park Revitalization Plan.

Criterion: MNR Lake Ontario Fish Community Objectives

Indicator: Consistency with the goals of the MNR Lake Ontario Fish Community Objectives

The MNR Fish Community Objectives for Lake Ontario (2013) were created to advance the goals and objectives of the Lake Ontario Lakewide Management Plan (LaMP). On a local scale, the Preferred Alternative may advance the goals and objectives of the LaMP and MNR's Fish Community Objectives for Lake Ontario following full implementation of the LWC Project. A qualitative assessment of the ability of the Preferred Alternative to support Nearshore Zone Goals and Offshore Pelagic Zone Goals of the *Fish Community Objectives for Lake Ontario* was assessed.

The MNR Lake Ontario Fish Community Objectives identifies the following goals for the Nearshore and Offshore Pelagic Zones:

Nearshore Zone	Protect, restore and sustain the diversity of the nearshore fish community, with an emphasis on self-sustaining native fish such as Walleye, Yellow Perch, Lake Sturgeon, Smallmouth Bass, Largemouth Bass, sunfish, Northern Pike, Muskellunge, Round Whitefish, and American Eel.
Offshore Pelagic Zone	Maintain the offshore pelagic fish community that is characterized by a diversity of trout and salmon species including Chinook Salmon, Coho Salmon, Rainbow Trout, Brown Trout, and Atlantic Salmon, in balance with prey fish populations and lower trophic levels.

The LWC Project results in aquatic habitat improvements that will provide local gains to riverine, nearshore, and coastal habitats. With respect to the MNR Lake Ontario Fish Community Objectives, LWC Project will:

- Support cool and cold water riverine and nearshore pelagic fish species by providing for improved primary productivity and foraging opportunities through the provision of streambank habitat within the new creek channels.
- Support pelagic salmonids and other top predators by providing highly productive habitat for pelagic forage fish species through the creation of new cobble beaches.
- Support cool and cold water fish communities through the creation of lee side island habitat augmented with surcharged areas (i.e., point shoal and rock piles).
- Provide, overall, a foundation for a healthier and broader fisheries community through the creation of:
    - new open coast shoreline, including structural habitat features along the toe of the revetment, which provides foraging, spawning, and nursery habitat;
    - lee side island habitat which provides sheltered conditions for Lake Ontario species;
    - coastal wetland habitat which provides sheltered, warmwater conditions for foraging, feeding, and spawning; and
    - riverine habitat within the new Serson Creek and Applewood Creek channels and existing Serson Creek stormwater channel which provides refuge, foraging and spawning habitat.

Summary of: Consistency with the goals of the MNR Lake Ontario Fish Community Objectives

The LWC Project results in aquatic habitat improvements that will provide local gains to riverine, nearshore and coastal habitat that are expected to help meet the nearshore and offshore goals of the MNR Lake Ontario Fish Management Plan. As a result, the LWC Project is expected to have a positive effect on coordination with the MNR Lake Ontario Fish Management Plan.

Criterion: Consistency with CVC's hazard land guidelines and regulations.

Indicator: Potential for flooding as a result of land creation

The Preferred Alternative was reviewed against CVC's hazard land guidelines and regulations to ensure that the land creation will not increase potential for flooding and hazard. As part of land creation, the Preferred Alternative will have 200-300 m extension of Applewood and Serson Creeks from their existing outlets. The LWC would also have wetland features adjacent to the extended creeks. There may be minor changes (increase/decrease) in water surface elevations upstream of the new proposed channel, but it does not show any negative effect on flooding or flow conveyance due to the new proposed channel. There is currently accumulated debris at the

Serson Creek outlet to Lake Ontario which will be removed as part of the creek extension. The blockage removal will provide better flow conveyance at the outlet, which will eventually improve flooding conditions upstream of the new channel.

In Applewood Creek the extended channel has wetland features that will not produce a negative effect on flooding upstream of the extended channel.

Summary of: Consistency with CVC's hazard land guidelines and regulations.

Upon establishment of the LWC Project, there will be no negative impacts on flooding in either Applewood or Serson Creeks. The LWC Project will provide improvement of flow conveyance at the Serson Creek outlet and improvement of flooding upstream of the extended channel.

Table 7.13 Objective 4: Coordination (Establishment/Post-Establishment Effects)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
Consistency with City of Mississauga Waterfront Parks Strategy (2008)	Consistency of alternative with Waterfront Parks Strategy	• The LWC Project will be consistent with a number of the goals identified in the Waterfront Parks Strategy by improving trail connections along the waterfront and providing more natural, sustainable ecological features within the park area.	None	**Positive** • The LWC Project will result in a positive contribution to the City of Mississauga Waterfront Parks Strategy.
Consistency with the Visioning for Inspiration Lakeview	Consistency of alternative with Visioning for Inspiration Lakeview	• The LWC Project will provide a vast green space in front of the WWTF and Inspiration Lakeview site that otherwise would not exist.	None	**Positive** • The LWC Project will consistent with Visioning for Inspiration Lakeview.
	Ability to integrate alternative with potential plans for OPG's Lakeview site	• The LWC Project will provide a continuous trail connection along Lake Ontario between OPG's Lakeview site and Marie Curtis Park.	None	**Positive** • The LWC Project will result in positive linkages with \ OPG's Lakeview site.
Consistency with LOISS	Consistency of alternative with priorities identified by LOISS	• The LWC project is: o compatible with priorities identified in LOISS; o supports the function of this significant bioregional corridor; and, o does not conflict with goals for restoration of natural ecosystems including habitat creation that is consistent with recommendations from LOISS.	None	**Positive** • Compatible with priorities identified in LOISS. • Support the function of this significant bioregional corridor. • Does not conflict with restoration goals.
Consistency with Lake Ontario Biodiversity Strategy	Consistency of alternative with priorities identified by the Lake Ontario Biodiversity Strategy	• Consistent with five targets of the Lake Ontario Biodiversity Strategy: o Creation of coastal wetlands; o Enhancing the nearshore zone; o Establishing coastal terrestrial systems; o Improving river, estuaries, and connecting channels; and o The establishment of islands. • Consistent with recommendations to protect and restore the health of Lake Ontario: o Restore connections and natural hydrology; and o Restore the quality of nearshore waters. • Potential negative effect on the 166-m of existing sand beach immediately south of the WWTF, and a section of sand beach at Marie Curtis Park West.	• Loss of sand beach south of the WWTF will be replaced with high quality coastal wetland habitats, and the establishment of a cobble beach and island system. • Sand beach at Marie Curtis Park West will remain in place, but will be located behind the new cobble beach face.	**Positive** • Consistent with biodiversity targets for Lake Ontario. • Consistent with recommendations to protect and restore the health of Lake Ontario. • Negative effect on the sand beach south of the WWTF is mitigated through creation of additional high quality wetland habitat and cobble beach and island system. • The sand beach at Marie Curtis Park West will not be lost.
Consistency with Marie Curtis Park Revitalization Plan	Ability to integrate recreational opportunities and trails between the LWC Project, Arsenal Lands and Marie Curtis Park	• The new Waterfront Trail will provide improved trail connections along and to the waterfront, which is consistent with the plan.	• None	**Positive** • Improved trail connections to and along the waterfront will support the Marie Curtis Park Master Plan

Table 7.13 Objective 4: Coordination (Establishment/Post-Establishment Effects) (Cont'd)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
MNR Lake Ontario Fish Community Objectives	Consistency with the MNR Lake Ontario Fish Community Objectives	• The LWC Project will provide local gains with regard to achieving goals established in MNR's Fish Community Objectives for Lake Ontario.	None	**Positive** • Improvements are anticipated both regionally and locally to the riverine, nearshore and coastal marsh fish communities.
Consistency with CVC's hazard land guidelines and regulations.	Potential for flooding as a result of land creation	The LWC Project will provide improvements to flow conveyance at the outlet of Serson Creek. Upstream of the extended Serson Creek, flood risk will be reduced. There will not be any negative effect on flooding in Applewood Creek upstream of the extended channel.	None	Positive • Improvement of flow conveyance and flooding.

7.3.4.3 Summary of the Coordination Objective

The Coordination objective for the LWC Project aims to integrate the LWC Project with the other planning initiatives that will affect the waterfront within the LWC Project Study Area. The Preferred Alternative for the LWC Project was evaluated for alignment of goals, objectives, and planned improvements associated with each initiative.

In order to assess the effects of the LWC Project, coordination with eight plans, strategies or guidelines were evaluated under one criteria and indicator for construction and seven criteria and eight indicators for establishment/post-establishment phase effects.

The construction access road will overlap 5 m of the Waterfront Trail that has been upgraded as part of the implementation of the Marie Curtis Park Revitalization Plan and will pass through the Arsenal Lands. However, mitigation measures such as minimizing the footprint of the access road and temporary re-routing of the Waterfront Trail are expected to minimize effects so that they are negligible and do not represent a detrimental effect on the Marie Curtis Park Revitalization Plan and future plans for the Arsenal Lands.

Following implementation of the LWC Project, it is expected to:

- be consistent with a number of City of Mississauga Waterfront Parks Strategy goals including improving trail connections and providing more natural, sustainable ecological features;
- create a green space between the WWTF and Lake Ontario that is consistent with the Visioning for Inspiration Lakeview;
- provide a continuous trail connection along the waterfront between Marie Curtis Park and OPG's Lakeview site that is consistent with the Visioning for Inspiration Lakeview;
- be compatible with the LOISS priorities including restoration of natural ecosystems and creation of terrestrial and aquatic habitat;
- be consistent with the Lake Ontario Biodiversity Strategy targets including the creation of aquatic habitat that will restore connections and quality of nearshore waters;
- provide an opportunity to meet planned conditions for the Arsenal Lands;
- provide improved Waterfront Trail connections along the waterfront consistent with Marie Curtis Park Revitalization Plan;
- provide local gains with potential regional effects towards the goals of MNR's Fish Community Objectives for Lake Ontario for the nearshore and offshore zones; and
- provide improved flood conditions in Serson Creek and no increase in flood risk in Applewood Creek.

The net effect of the LWC Project during establishment/post-establishment with respect to coordination with other plans, strategies and guidelines is positive.

Overall, the Preferred Alternative for the LWC Project meets the Coordination objective.

Table 7.14 Overall Effects Related to Objective 4

Criteria	*Indicator*	*Overall Effects*
Construction		
Consistency with Marie Curtis Park Revitalization Plan	Ability to integrate recreational opportunities and trails between the LWC, Arsenal Lands and Marie Curtis Park	Positive
Establishment/Post-Establishment		
Consistency with City of Mississauga Waterfront Parks Strategy (2008)	Consistency of alternative with Waterfront Parks Strategy	Positive
Consistency with the Visioning for Inspiration Lakeview	Consistency of alternative with Visioning for Inspiration Lakeview	Positive
	Ability to integrate alternative with potential plans for OPG's Lakeview site	Positive
Consistency with LOISS	Consistency of alternative with priorities identified by LOISS	Positive
Consistency with Lake Ontario Biodiversity Strategy	Consistency of alternative with priorities identified by the Lake Ontario Biodiversity Strategy	Positive
Consistency with Marie Curtis Park Revitalization Plan	Ability to integrate recreational opportunities and trails between the LWC, Arsenal Lands and Marie Curtis Park	Positive
MNR Lake Ontario Fish Community Objectives	Consistency with the goals of the MNR Lake Ontario Fish Community Objectives	Positive
Consistency with CVC's hazard land guidelines and regulations.	Potential for flooding as a result of land creation	Positive
Summary: **Construction and establishment of the LWC Project will have positive effects on other plans and policies within the Project and Regional Study Areas. Overall, the Preferred Alternative for the LWC Project meets the Compatibility objective.**		

7.3.5 Objective 5: Fiscal Viability

7.3.5.1 Construction Effects

Criterion: Capital Development Costs[17]

Indicator: Capital Construction Cost Estimate

A capital construction cost estimate was prepared for the Preferred Alternative to determine the fiscal viability of the LWC Project. Capital construction costs were developed based on current, relevant construction rates, knowledge of the local market conditions and a database of cost information for projects involving similar large scale soil- and waterfront-specific projects from across Southern Ontario. The costs outlined in this section are based on a number of basic assumptions and a great deal of relevant project experience with similar waterfront projects. The costing incorporates the most up-to-date tipping fees, fill disposal locations and anticipated source locations. Key assumptions to reduce construction costs are that a portion of the protection features would consist of free materials (e.g. construction rubble) and the reuse of armourstone onsite.

Based on the upper limit of 2.0 million m^3 of fill, total capital costs were estimated to be $65.4 million. Currently, clean fill and construction rubble generated by Region of Peel infrastructure projects is trucked to rural areas for disposal with associated tipping fees and transportation costs. By developing the LWC Project, the Region of Peel can utilize some of this material and save on disposal and transportation costs. The Region of Peel estimates total savings of $25.5 million through the diversion of clean fill and construction rubble to the LWC Project. This estimate assumes offsets from transportation and disposal costs on other Region of Peel projects and revenue associated with tipping fees generated from private sector projects. The net estimated capital construction cost for the LWC Project is $39.9 million for the upper limit of 2.0 million m^3 of fill.

Criterion: Amount of fill material to be diverted from rural disposal sites

Indicator: Volume of earth fill (soil) and construction rubble in cubic metres

Clean fill and construction rubble generated by infrastructure projects is often trucked to rural areas where fill disposal is becoming an increasingly controversial land use due to undesired environmental effects. Diverting clean fill and construction rubble from these areas to more sustainable land uses such as the LWC Project helps to reduce strain on rural disposal sites. The LWC Project will divert an estimated 2.0 million m^3 of material from rural disposal sites.

[17] All cost estimates are in 2013 dollars.

Summary of: Amount of fill material to be diverted from rural disposal sites

The LWC Project will divert an estimated 2.0 million m^3 of material from rural disposal sites.

Criterion: Economic and Employment Effects

The potential economic and employment effects resulting from the construction of the Preferred Alternative were estimated using the Statistics Canada Input – Output Model ("I/O Model"), using multipliers specific to the Ontario economy. The I/O model uses the Canadian Input/Output tables to track and quantify the economic activity generated by changes in consumption or production. As such, it traces the flow of goods and services amongst various sectors of the economy. The model is maintained by Statistics Canada, and presents one of the most complete and detailed accounting frameworks of the Canadian economy. As such the model has the greatest potential of all major economic models for capturing the flows of goods and services between industries and consumers at relatively detailed levels. It should be noted that, as the I/O model only measures impacts at the provincial level, within Ontario and outside Ontario, the proportion of impacts allocated to a particular region/local area of the province cannot be identified. The I/O Model is primarily used to predict how an increase or decrease in demand in one industry will impact other industries, and, therefore, the entire economy. The following indicators were measured by the I/O model:

Indicator: Economic Output

Economic output refers to the overall amount of economic activity created. Economic output related to construction of the LWC Project is estimated to be $138.4 million over the construction period.

Indicator: Gross Domestic Product

Gross domestic product (GDP) is a measure of the value-added to the economy by productive activities taking place within the province and also in other provinces. GDP related to construction of the LWC Project is estimated to be $70.2 million over the construction period.

Indicator: Number of direct full time jobs created

Direct full time jobs are those that are directly associated with the LWC Project such as construction jobs. An estimated 372 direct full time jobs will be created by the LWC Project.

Indicator: Number of indirect full time jobs created

Indirect full time jobs are created by activity in sectors that supply goods and services that support the construction activity. An estimated 230 indirect full time jobs will be created by the LWC Project.

Indicator: Number of induced full time jobs created

Induced full time jobs are measured based on the overall impact of more income accruing to the household sector (in other words, spending of wages/salaries in the broader economy by those employed by the construction project). An estimated 176 induced full time jobs will be created by the LWC Project.

Summary of: Economic and Employment Effects

An estimated total of 778 direct, indirect and induced full time jobs will be created by the construction of the LWC Project. Construction of the LWC Project will have substantial economic benefits through job creation and economic activity both within and outside of Ontario.

Table 7.15 Objective 5: Fiscal Viability (Construction Effects)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
Capital development cost	Capital Construction Cost estimate	Gross $65 Million	Savings through re-use of fill: $21.4 Million Savings through re-use of rubble: 4.1 Million Total Savings: $25.5 Million	Net Capital Cost: $39.5 Million
Amount of fill material to be diverted from rural disposal sites	Volume of earth fill (soil) placed, brick ruble and concrete in cubic metres.	• Up to 2.0 Million m^3 of diverted material; • Reduced impact on fill capacity at rural disposal sites.	None	Positive
Economic and employment benefits	Economic Output	$138.4 Million	None	Positive
	Gross Domestic Product	$70.2 Million	None	Positive
	# of direct full time jobs created	372 direct full time jobs	None	Positive
	# of indirect full time jobs created	230 indirect full time jobs	None	Positive
	# of induced full time jobs created	176 induced full time jobs	None	Positive

7.3.5.2 Establishment/Post Establishment-Effects

Criterion: Annual maintenance costs for naturalized area

The analysis for CVC's land care costs accounts for Operational staff time, land planning staff time, administrative charge-backs and overhead, taxation, equipment, vehicles, purchase materials for maintenance and modest annual capital improvements and replacement.

The ongoing annual operating budget for the LWC Project is expected to fluctuate slightly from year to year based on shifting needs as the area matures or as particular issues arise and are addressed. The operating costs are also required to keep pace with inflation to ensure that the land care is maintained at appropriate levels. It is also important to note that the LWC Project is not projected to be revenue generating and will not return any funds towards operational costs; The LWC Project is to remain a free-use amenity for public benefit with operations and maintenance costs that must be borne by public funds.

Indicator: Annual cost of maintenance of naturalized and park areas

With the LWC Project estimated to be approximately 33 hectares in size and an estimated $2975/hectare operations and maintenance costs would total $100,000 per year. Tested against TRCA's annual operating budgets for three similar lakefill parks (and adjusted for size and elements) the estimated annual budget is substantiated and confirmed as appropriate and in-line with established operations and maintenance care costs for such lands.

Table 7.16 Objective 5: Fiscal Viability (Establishment/Post-Establishment Effects)

Criteria	Indicator(s)	Effects	Mitigation Measures	Net Effects
Annual maintenance costs for naturalized area	Annual cost of maintenance of naturalized and park areas	$100,000 in annual expenditure for maintenance	none	$100,000 in annual expenditure for maintenance

Summary of Fiscal Viability Objective

Table 7.17 Overall Effects Related to Objective 5

Criteria	*Indicator*	*Overall Effects*
Construction		
Capital development cost	Capital Construction Cost estimate	n/a
Amount of fill material to be diverted from rural disposal sites	Volume of earth fill (soil) placed, brick rubble and concrete in cubic metres	Positive
Economic and employment benefits	Economic Output (all provinces combined)	Positive
	Gross Domestic Product (all provinces combined)	Positive
	# of direct full time jobs created	Positive
	# of indirect full time jobs created	Positive
	# of induced full time jobs created	Positive
Establishment/Post-Establishment		
Annual maintenance costs for naturalized area	Annual cost of maintenance of naturalized and park areas	n/a
Summary: **Based on support from the Region of Peel Council, the LWC Project meets the fiscal viability objective.**		

7.4 SENSITIVITY ANALYSIS FOR A SMALLER LWC PROJECT FOOTPRINT

The LWC Preferred Alternative presented in Chapter 6 and the effects assessment presented in Section 7.3 are based on the LWC Project footprint utilizing a maximum of 2.0 million m^3 of clean fill. The effects assessment was conducted based on this maximum footprint to capture the "worst-case scenario" for any potential negative effects.

As noted in Chapter 5, a smaller version of the Preferred Alternative could be developed depending on the availability of fill material and budget considerations as the LWC Project advances to detailed design. Further analysis by the LWC Technical Team indicates that a footprint utilizing approximately 1.5 million m^3 of clean fill would be the smallest footprint that could be established, while maintaining the same preferred shoreline configuration and functions, minimum habitat requirements, and park accessibility from Marie Curtis Park west as presented in Chapter 6 for the larger footprint. To confirm that the 2.0 million m^3 footprint captures the "worst-case scenario" for any potential negative effects and that the smaller 1.5 million m^3 footprint does not significantly reduce positive effects, a sensitivity analysis is presented in this section to establish that the effects associated with a smaller footprint would be the same or better.

To facilitate the sensitivity analysis, the Preferred Alternative presented in Chapter 6 was reduced in size using the same coastal process principles presented in Chapter 5 to ensure stability of the design. The ecological layers were scaled down relative to the overall footprint while recognizing the desire to maintain the recommended habitat targets. Based on the reduced footprint of the Preferred Alternative, a screening of each criterion and indicator is presented in Table 7.19 to identify indicators for which the effects will change for a smaller footprint. Where it is determined that there is potential for increased negative effects or reduced positive effects associated with developing a smaller LWC Project footprint, a discussion of the changes to effects is presented in Table 7.19 to identify the significance of any changes. Figure 7.2 provides a side-by-side visual comparison of the LWC project at the 2.0 million m^3 and 1.5 million m^3.

Figure 7.2 LWC Project Preferred Alternative at 2.0 and 1.5 Million Cubic Metres of Fill

Table 7.18 Sensitivity Analysis

Criteria	Indicator	Effects at a 1.5 Million m^3 Footprint	Effects at 1.5 Million m^3	Effects at 2.0 Million m^3
Naturalization				
Change in shoreline character	Change in diversity of shoreline types (% increase or % decrease).	A smaller footprint will change the dimensions of the various shoreline types. At a 1.5 million m^3 footprint, the overall length of shoreline increases from 1,700 m (current shoreline length) to 2,700 m with a similar diversity of shoreline types as described for the 2.0 million m^3 footprint. Although the change in shoreline diversity is less at the 1.5 million m^3 footprint, similar benefits compared to existing conditions are achieved.	Positive	Positive
	Quantitative assessment of shoreline irregularity and the ability to provide nearshore habitat.	A smaller footprint will change the length of new shoreline in comparison to the existing shoreline. The 2.0 million m^3 footprint will provide a shoreline that is 2.1 times longer than the former shoreline over the same area. The 1.5 million m^3 footprint will provide a shoreline that is 1.6 times longer than the former shoreline over the same area. Although the shoreline will be slightly shorter at a smaller footprint there will still be a similar increase in diversity of shoreline types and associated ecological benefits.	Positive	Positive
Ability to create functional habitat blocks	Area of habitat created (m^2) of wetland, forest, and, meadow.	A smaller footprint will necessitate a reduction in the area of habitat blocks described for the 2.0 million m^3 footprint. Habitat blocks have been adjusted within the 1.5 million m^3 footprint in the same general configuration as the 2.0 million m^3 footprint. Although the smaller footprint results in smaller habitat blocks, the habitat blocks still meet or exceed the recommended habitat targets within a smaller footprint.	Positive	Positive
	Assessment of improvements to aquatic habitat created and ecological benefits achieved through the changes to Serson and Applewood Creeks.	Similar habitat improvements and ecological benefits can be achieved in Applewood and Serson Creek within a smaller footprint size. Ecological benefits are positive with either footprint size.	Positive	Positive
	Qualitative assessment of habitat created including benefits created by LWC with respect to filling in missing and/or impaired portions of aquatic and terrestrial ecosystems in this part of the Mississauga waterfront.	No changes are anticipated for this criterion at a smaller footprint. Ecological benefits continue to be positive with respect to improving impaired ecological function along the Mississauga waterfront.	Positive	Positive
	Qualitative assessment of connectivity between habitats for the movement for wildlife (e.g. mammals, herptofauna, invertebrates, fish, birds, etc.).	No changes are anticipated for this criterion at a smaller footprint. A smaller footprint will continue to have improved connectivity between habitats for the movement of wildlife.	Positive	Positive
Ability of alternative to be self-compensating with respect to fish habitat	Area of aquatic habitat lost or altered (ha).	A smaller footprint will reduce the overall area of existing fish habitat lost or altered so the negligible effects described for the 2.0 million m^3 footprint will not increase for this indicator at the 1.5 million m^3 footprint.	Negligible	Negligible
	HAAT model estimates of area requiring compensation (ha).	The area requiring compensation will change based on the reduced area of land creation and reduced area of proposed habitat features. The updated HAAT model results in less compensation area estimated for the 1.5 million m^3 footprint. The 2.0 million m^3 footprint requires 5.8 ha of like compensation whereas the 1.5 million m^3 footprint will require 4.7 ha of like compensation. Ancillary ecological benefits that are not captured in the HAAT model will result in neutral (no) net effects on fish habitat at both the 2.0 and 1.5 million m^3 footprints.	None	None
	Potential disruption to fish habitat as a result of land creation activities (siltation, fish removal, etc.).	Potential negative effects identified in Section 7.3.1 for the 2.0 million m^3 footprint can be mitigated using best management practices resulting in negligible effects. The smaller footprint will reduce the area of fish habitat potentially affected by land creation activities which will not increase predicted effects.	Negligible	Negligible

Table 7.18 Sensitivity Analysis (Cont'd)

Criteria	Indicator	Effects at a 1.5 Million m^3 Footprint	Effects at 1.5 Million m^3	Effects at 2.0 Million m^3
Habitat removal or disruption during construction of site access road and laydown area	Area of terrestrial habitat and vegetation removed or disrupted (m^2).	The access route will not change based on a smaller footprint so there will be additional negative effects resulting from a smaller footprint.	Negligible	Negligible
	Number of Species at Risk removed/disrupted.	The access route will not change based on a smaller footprint so there will be additional negative effects resulting from a smaller footprint.	None	None
	Area of aquatic habitat removed or disrupted (m^2).	The access route will not change based on a smaller footprint so there will be additional negative effects resulting from a smaller footprint.	Negligible	Negligible
Effects of hydraulics and hydrology / sedimentation on sustainability of wetland communities	Qualitative assessment of ability to manage a full range of flows without adverse impact on wetland communities (high erosional stress, sediment deposits).	A smaller footprint will not affect the configuration of Serson Creek but will require changes to Applewood Creek. Changes to Applewood Creek were assessed and it was determined that the creek design within the smaller footprint results in no changes to the effects described for this indicator.	Negligible	Negligible
	Influence of lake level fluctuation on channel and wetland connectivity.	Lake level fluctuation will affect channel and wetland connectivity similarly at both the 1.5 and 2.0 million m^3 footprints.	Negligible	Negligible
	Potential for sedimentation to affect channel form (including river mouths) and associated vegetation.	Sedimentation will affect channel form and associated vegetation similarly at both the 1.5 and 2.0 million m^3 footprints.	Negligible	Negligible
	Qualitative assessments of the adaptability of the wetland function to climate change.	Wetland function will adapt to climate change similarly at both the 1.5 and 2.0 million m^3 footprints.	Negligible	Negligible
	Qualitative assessment to determine the ability of river channels and shoreline works to accommodate changes in flow and lake levels due to climate change.	The ability of river channels and shoreline works to accommodate changes in flow and lake levels due to climate change will be similar at both the 1.5 and 2.0 million m^3 footprints.	Negligible	Negligible
Access				
Potential for lookout areas	Number of opportunities for views and character of views from the LWC Project to Lake Ontario, OPG's Lakeview site to Lake Ontario and back to the cities of Mississauga and Toronto and from the Lake Ontario onshore.	A smaller footprint will still provide opportunities for views to Lake Ontario, OPG's Lakeview site and the cities of Mississauga and Toronto.	Positive	Positive
Potential for change in access to and use of waterfront trail during construction	Duration and length of trail closed to use.	Effects to the Waterfront Trail are related to the construction and operation of the construction access route which is the same regardless of the final footprint size.	Negligible	Negligible
	Potential for signalization of trail crossing with construction vehicles.		None	None
Potential for change to use and enjoyment of park areas during construction	Potential for dust and vehicle emissions and noise to affect Waterfront Trail use and enjoyment.	Changes to use and enjoyment of park areas during construction are related to the construction site access road so the effects described in Section 7.3 are the same at a smaller footprint.	Negligible	Negligible
	Potential for changes in ability to access and use park during construction due to traffic congestion and or changes to access.		Negligible	Negligible
Potential for changes to use of waterfront for recreation	Potential for changes to water quality at Marie Curtis Beach West with respect to swimming.	Similar to the larger footprint, modeling indicates the developing a smaller footprint is unlikely to affect the frequency of annual beach closure posting at Marie Curtis Park beach.	Negligible	Negligible
	Potential for changes to existing recreational activities on the sand beach at Marie Curtis Park west.	A smaller footprint will reduce the amount of existing sand beach at Marie Curtis Park west that is affected by the LWC Project, so any negative effects will be reduced.	Negligible	Negligible

Table 7.18 Sensitivity Analysis (Cont'd)

Criteria	Indicator	Effects at a 1.5 Million m^3 Footprint	Effects at 1.5 Million m^3	Effects at 2.0 Million m^3
	Potential for changes to use for windsurfers and/or kiteboarders	A smaller footprint will reduce the amount of existing sand beach at Marie Curtis Park west that is affected by the LWC Project and will reduce the extent of potential new navigation hazards in Lake Ontario, so any negative effects will be reduced.	Negligible	Negligible
Potential for public access to water's edge	Percentage of accessible water's edge	All of the positive effects described for this criterion will be realized within a smaller footprint.	Positive	Positive
	Potential to create tiered trail system providing seasonal access	A tiered trail system can be established within the smaller land creation area so positive effects will still be achieved at a smaller footprint.	Positive	Positive
	Potential to create multi-use trail connection across area of land creation	A multi-use trail connection can be established across the smaller land creation area so positive effects will still be achieved at a smaller footprint.	Positive	Positive
Potential for displacement of *built heritage resources* due to construction of access road, laydown area and land creation area	Cultural heritage value of built heritage resources and cultural heritage landscapes within land creation area	Effects under this criterion are related to the construction site access road so the effects described in Section 7.3 are the same at a smaller footprint.	None	None
Potential effects from construction of access road, laydown area and land creation area on marine- and land-based archaeological resources	Significance of archaeological resources within footprint of land creation and associated park area	A smaller footprint will not increase negative effects on archaeological resources since a smaller marine area will be affected by project activities and no new areas are impacted by the smaller footprint. Effects under this criterion that relate to the construction site access road are the same at a smaller footprint.	Negligible	Negligible
Potential for effect from construction of access road, laydown area and land creation area on traditional uses of lands by *First Nations* and *Métis*	Extent of traditional uses of lands within LWC Project Study Area	There are no net effects to this criterion at the 2.0 million m^3 fill volume, which will be the same at a smaller footprint.	None	None
Compatibility				
Potential to affect operations at WWTF	Changes in access to outfall during construction	A smaller footprint will not increase negative effects on existing WWTF outfalls since the smaller footprint will not affect additional access points.	Negligible	Negligible
	Changes to access to outfall during establishment/post-establishment		None	None
Changes to site security for WWTF	Ability to maintain/enhance site security for the WWTF	A smaller footprint will not increase negative effects on site security at the WWTF since the same mitigation measures can be applied regardless of the extent of the land creation area in Lake Ontario.	Negligible	Negligible
Potential for effects to water quality at Water Treatment Plant intakes	Potential for effects during construction	The smaller footprint has potential for effects related to high sediment loads during placement of berm and fill materials however these potential effects can be mitigated using proven land creation methods and potential impacts do not increase with a smaller footprint.	Negligible	Negligible
	Potential for effects during establishment/post-establishment	Regional water circulation modeling indicates that the land creation results in no change or moderate improvements in water quality at the intakes at both the 1.5 M m^3 and 2.0 M m^3 footprints.	Positive/None	Positive/None
Potential for construction traffic to affect traffic volumes on arterial roads and access and egress from arterial roads	Additional vehicle traffic on arterial roads resulting from construction	A smaller footprint will require less fill and fewer truck trips into the site to supply the fill. This will result in an overall reduction in construction related truck traffic which will not increase traffic related effects.	Negligible	Negligible
Potential for construction traffic volumes to require changes to intersections	Number of intersections requiring changes to facilitate LWC related construction traffic	A smaller footprint will require less fill and fewer truck trips into the site to supply the fill. This will result in an overall reduction in construction related truck traffic which will not increase traffic related effects.	None	None

Table 7.18 Sensitivity Analysis (Cont'd)

Criteria	Indicator	Effects at a 1.5 Million m^3 Footprint	Effects at 1.5 Million m^3	Effects at 2.0 Million m^3
Coordination				
Consistency with City of Mississauga Waterfront Parks Strategy (2008)	Consistency of alternative with Waterfront Parks Strategy	A smaller footprint will remain consistent with the City of Mississauga Waterfront Parks Strategy (2008) and provide similar positive effects.	Positive	Positive
Consistency with the Visioning for Inspiration Lakeview	Consistency of alternative with Visioning for Inspiration Lakeview	A smaller footprint will remain consistent with the Visioning for Inspiration Lakeview and provide similar positive effects.	Positive	Positive
	Ability to integrate alternative with potential plans for OPG's Lakeview site		Positive	Positive
Consistency with LOISS	Consistency of alternative with priorities identified by LOISS	A smaller footprint will remain consistent with LOISS and provide similar positive effects.	Positive	Positive
Consistency with Lake Ontario Biodiversity Strategy	Consistency of alternative with priorities identified by the Lake Ontario Biodiversity Strategy	A smaller footprint will remain consistent with the Lake Ontario Biodiversity Strategy and provide similar positive effects.	Positive	Positive
Consistency with Marie Curtis Park and Arsenal Lands Master Plan	Ability to integrate recreational opportunities and trails between the LWC, Arsenal Lands and Marie Curtis Park	A smaller footprint will remain consistent with Marie Curtis Park and Arsenal Lands Master Plans and provide similar positive effects.	Positive	Positive
MNR Lake Ontario Fish Community Objectives	Consistency with the goals of the MNR Lake Ontario Fish Community Objectives	A smaller footprint will remain consistent with MNR Lake Ontario Fish Community Objectives and provide similar positive effects.	Positive	Positive
Consistency with CVC's hazard land guidelines and regulations.	Potential for flooding as a result of land creation	A smaller footprint will not result in negative impacts on flooding in either Applewood or Serson Creeks. The LWC Project will provide improvement of flow conveyance at the Serson Creek outlet and improvement of flooding upstream of the extended channel.	Positive	Positive
Fiscal Viability				
Capital development cost	Capital Construction Cost estimate	Net capital construction costs will be $$$ for the 1.5 million m^3 footprint compared to $$$ for the 2.0 million m^3 footprint.	n/a	n/a
Amount of fill material to be diverted from rural disposal sites	Annual cost of maintenance of naturalized and park areas	Annual maintenance requirements will be similar regardless of the footprint size.	n/a	n/a
Economic and Employment Benefits	Economic Output (all provinces combined)	The 1.5 million m^3 footprint will reduce overall economic output to $115.7 million compared to $138.4 million at the 2.0 million m^3 footprint. Despite a minor reduction in overall economic output, the net effect remains positive.	Positive	Positive
	Gross Domestic Product (all provinces combined)	The 1.5 million m^3 footprint will reduce GDP generated to $58.7 million compared to $70.2 million at the 2.0 million m^3 footprint. Despite a minor reduction in GDP generated, the net effect remains positive.	Positive	Positive
	# of direct full time jobs created	The 1.5 million m^3 footprint will reduce number of direct full time jobs created to 311 compared to 372 at the 2.0 million m^3 footprint. Despite a minor reduction in direct full time jobs created, the net effect remains positive.	Positive	Positive
	# of indirect full time jobs created	The 1.5 million m^3 footprint will reduce number of indirect full time jobs created to 193 compared to 230 at the 2.0 million m^3 footprint. Despite a minor reduction to indirect full time jobs created, the net effect remains positive.	Positive	Positive
	# of induced full time jobs created	The 1.5 million m^3 footprint will reduce number of induced full time jobs created to 147 compared to 176 at the 2.0 million m^3 footprint. Despite a minor reduction in induced full time jobs created, the net effect remains positive.	Positive	Positive

8.0 MONITORING AND ADAPTIVE ENVIRONMENTAL MANAGEMENT

The LWC Project goal is "to create a new natural park that will establish ecological habitat and public linkages on the eastern Mississauga waterfront". Based on this goal, a series of alternative LWC Project configurations were considered (Chapter 5). The Preferred Alternative was selected based on its ability to best achieve LWC Project objectives and is detailed in Chapter 6 and assessed in Chapter 7. The Preferred Alternative meets the ecological design recommendations[18] that will provide functional naturalization (see Chapter 6 and Table 8.1). The monitoring and adaptive environmental management (AEM) process presented in this Chapter will ensure that recommended design requirements are maintained and work to maximize ecological function of the LWC Project as identified through a set of performance indicators[19] developed during detailed design.

Table 8.1 Recommended Ecological Design Goals for the LWC Project

Habitat Component	Minimum Recommended Ecological Design Goals
Wetlands	Wetland habitat area = 3.5 – 9.5 ha
Forest & Treed Swamp	Forest & Treed Swamp habitat area = 4 ha
Meadow	Meadow habitat area = 10 ha

Given the unique character of the LWC Project, the complexity of ecological interactions and consideration of adjacent planning initiatives that influence and will be influenced by the LWC Project, this EA anticipates the need for a certain degree of flexibility within the outcomes, throughout the life of the LWC Project. The monitoring and AEM process presented in this chapter coupled with the EA amendment mechanism presented in Chapter 9 provides a framework from which designers and project managers can use the flexibility built into the EA to maximize LWC Project benefits and minimize any potential negative effects (see Chapter 7) after this EA has been approved. The monitoring and AEM process will be managed by CVC with input from other LWC Project stakeholders where appropriate.

Section 8.1 describes the monitoring program that informs both the detailed design process and the AEM process for the LWC Project to ensure that the objectives of the LWC Project are achieved. Section 8.2 describes the AEM process as it relates to the LWC Project.

[18] **Minimum design requirements** represent recommended minimum values for the various ecological components of the LWC Project (e.g. minimum wetland area). Wherever possible these values will be maximized through the detailed design, the individual project components can be smaller than these minimum recommendations.

[19] **Performance indicators** will be developed for the LWC Project through the detailed design process to measure the environmental performance of the LWC Project (see Section 8.1.4). Performance indicators relate to the functional ecological attributes of the naturalized system. Performance indicators will be developed based on the monitoring of reference wetlands, baseline monitoring and ecological models.

As a reminder, the objectives of the LWC Project are:

1. **Naturalization** - Establish a diverse range of native terrestrial and aquatic ecosystem habitats and linkages in a degraded area of the eastern Mississauga waterfront.
2. **Access** - Create public linkages for access to and along the waterfront including the Waterfront Trail while allowing for compatible recreational, educational and cultural heritage opportunities.
3. **Compatibility** - Ensure that the LWC is compatible with existing infrastructure.
4. **Coordination** - Coordinate with and inform other local planning and development initiatives.
5. **Fiscal Viability** - Develop an innovative funding approach that maximizes public benefit and value by reusing locally generated fill from existing municipal (regional and local) capital works projects.

8.1 LWC PROJECT MONITORING PROGRAM

A comprehensive monitoring program is a critical element of the LWC Project from the pre-design phase through to the post-establishment phase. The monitoring program serves several functions throughout the life of the LWC Project:

1. **Baseline conditions monitoring** during the pre-design and design phases will continue to provide data that will inform detailed design elements and identify changes to the existing environment that may affect LWC Project outcomes. Any changes identified through pre-design and design phase monitoring can be incorporated into the detailed design and can inform the potential need for EA amendments if necessary (Chapter 9 presents an EA amendment process for the LWC Project);
2. **EA compliance monitoring** will ensure compliance with EA commitments and ensure that the LWC Project is constructed according to the recommended design requirements and final design elements. This monitoring information will be used to inform the AEM process (see Section 8.2). The AEM process will begin once the LWC Project is constructed (up to this point any LWC Project changes are design related and will be subject to the amendment process described in Chapter 9 if applicable); and
3. **Environmental performance monitoring** will measure if the LWC Project functions as intended during the establishment and post establishment phases.

A standardized data collection protocol will be established for the monitoring program to ensure data consistency. The specific data that is collected will depend on the current phase of the LWC Project so the type of data collected will evolve as the LWC Project progresses. Figure 8.1 shows the relationship between the different monitoring phases and the LWC Project phases.

Figure 8.1 Relationship between Monitoring Phases and LWC Project Implementation

	Project Planning and EA Submission	Detailed Design/ Construction Phases	Establishment Phase	Post-Establishment Phase
Baseline Conditions Monitoring	→	→		
EA Compliance Monitoring		→		
Environmental Performance Monitoring		→	→	→

8.1.1 Baseline Conditions Monitoring

CVC, TRCA and other agencies have been monitoring ecological conditions in Lake Ontario for decades providing a baseline of existing conditions (see Chapter 3) which has informed the planning and design of the LWC Project. Descriptions and mapping of existing conditions and aquatic habitat in the Project and Regional Study Areas has been assembled. Research has been conducted by the LWC Project EA Team to identify reference wetland sites along the north shore of Lake Ontario to identify an appropriate range of hydrologic and ecologic function to develop a better understanding of how vegetation communities respond to changes based on wetland bathymetry and topography.

Baseline conditions monitoring allows the study team to identify ecological changes that may occur between EA approval and project implementation, and the changes that may occur throughout the life of the project as external influences exert their pressure on the created landform, including the beaches, islands, creek channels, wetlands and upland areas. There may be a desire for continued baseline conditions monitoring following EA approvals determine whether:

- Significant changes in the existing environmental conditions have occurred that would influence the LWC Project as described in Chapter 6 prior to the detailed design stage and/or during the construction stage;
- The project is performing as anticipated during the establishment period of the project; and
- The completed project is sustainable and functioning under the range of future stressors that cannot be comprehensively defined at this time (i.e. due to climate change, colonization by new invasive species, changes in population and land use, etc.).

The baseline monitoring and modelling work will continue, as required, through the period between EA approval and detailed design to ensure that the most up-to-date and relevant information is used to develop the detailed design for the LWC Project.

8.1.2 EA Compliance Monitoring

EA compliance monitoring is a standard condition of approval for most projects subject to the *EA Act* in Ontario. The purpose of EA compliance monitoring is to ensure compliance with all EA and other commitments made during project planning and ensure that the LWC Project is constructed and operates as described within the range of predicted effects.

EA compliance monitoring will take place during the detailed design and construction period for the LWC Project. EA compliance monitoring will ensure adequate environmental protection through the construction period, document compliance with the EA, and monitor the implementation of the approved design using standard best management practices for construction. The EA compliance monitoring program will be managed by CVC. A detailed compliance monitoring plan will be developed as part of the overall environmental management plan to guide compliance monitoring during the construction phase.

EA compliance monitoring will address the following issues and potential effects:

- Ensure compliance with all commitments made in the EA including the implementation of mitigative measures as identified in the EA;
- Ensure compliance with erosion and sediment control plans;
- Ensure compliance during fish salvage and release activities;
- Ensure the implementation of fisheries mitigation measures (e.g., fisheries windows, maintenance of passage, etc.);
- Ensure compliance with migratory breeding bird periods;
- Ensure the implementation of best management practices during construction (e.g. air quality mitigation measures such as dust suppression and vehicle emissions management, noise management);
- Ensure compliance with all federal, provincial and municipal permits, licenses and approvals (e.g., ECA's, noise by-laws, tree removal by-laws, etc.);
- Ensure compliance with fuel storage and handling and spill response protocols;
- Ensure compliance with waste management plans; and
- Document the as-built features immediately following construction completion.

Table 8.2 below provides a summary of commitments resulting from the LWC Project EA which will be the basis for compliance monitoring.

Table 8.2 Summary of Commitments Resulting from the LWC Project EA

Timing	EA Commitment	EA Report Reference
Detailed Design	Ensure minimum habitat design recommendations are either maintained or enhanced as refinements are made through the detailed design process.	Section 6.1
	Establish site level details and specific habitat components for terrestrial habitat features.	Section 6.1.2.1 and Section 6.1.2.4
	Consider location and design of secondary and tertiary trails.	Section 6.1.3
	Discuss ancillary ecological benefits that could offset HAAT model estimates of compensation requirements with DFO, MNR and Conservation Authority biologists.	Section 7.3.1.1
	Evaluate options for enhancing the ecological function in the area surrounding the remnant treed beach.	Table 7.2
	Establish site level details for aquatic habitat features along the newly created shoreline.	Section 7.3.1.2
	Explore options to provide temporary access to the shoreline for the public viewing, including potential to establish an informal temporary viewing path.	Section 7.3.2.1
	Explore options to further reduce encroachment on the sand beach at Marie Curtis Park West.	Section 7.3.2.2
	Explore options to provide controlled access to wetlands and creeks.	Section 7.3.2.2
	Explore options to mitigate traffic effects at the intersection of Lakeshore Road and the temporary construction access route through the establishment of a right hand turn lane and a merge lane exiting the site.	Section 7.3.3.1
	Develop a fill tracking system to account for and audit all fill coming into the site.	
	Establish performance indicators to guide the Environmental Performance Monitoring program.	Section 8.0
	Establish specific triggers for potential adjustments, refinements or modifications that could occur as part of the adaptive management program.	Section 8.2.2.2
	Explore opportunities for interpretive signage.	Table 10.9
	Work with WWTF to ensure access and maintenance needs to their manholes for the outfall are provided.	
	Develop habitat structure refinements for the permanent rerouting of Serson Creek down the stormwater channel such that it does not impact flood conveyance requirements in the channel.	
Construction	Develop tree removal (include plant salvage and relocation) and compensation/restoration plan.	Section 6.3.2
	Monitoring of environmental site controls and mitigation measures during construction.	Section 8.1.2
	Obtain all relevant Municipal, Provincial, Federal and/or Regional occupancy permits.	Section 6.3.2
	All areas of the site disturbed by the haul road will be restored to original conditions or to an appropriate level of rough grading to match potential future Parks Master Planning conditions for the area, upon completion of LWC Project.	Section 6.3.2
Establishment/ Post-establishment	Monitor environmental performance to measure desired outcomes; determine if they have been achieved; and trigger adaptive management where necessary.	Section 8.1.3

EA compliance monitoring will continue until final grading is completed. Once final grading is complete, the environmental performance monitoring program (see Section 8.1.3) will begin and continue, as required, through the life of the project.

8.1.3 Environmental Performance Monitoring

The purpose of environmental performance monitoring is to measure desired outcomes related to naturalization, flood conveyance and shoreline stability; determine if they have been achieved; trigger adaptive measures where necessary; and inform the refinement of the as-built features. Environmental performance monitoring will commence at the completion of LWC Project construction, following final grading and as-built documentation. Table 8.3 provides examples of environmental performance monitoring that could be conducted for biophysical components of the LWC Project. The specific details and measures to be included in the environmental performance monitoring program for the LWC Project will be developed through the detailed design and construction phases.

Existing monitoring frameworks (e.g. CVC Integrated Watershed Monitoring Program and other targets refined from the Credit River Water Management Strategy Update and Subwatershed Plans) provide examples of performance monitoring that could be adapted specifically for the LWC Project. These existing monitoring frameworks will be augmented with additional performance indicators that address ecological and social aspects of LWC Project objectives. Monitoring results will be compared against the performance indicators developed during detailed design. The comparison of performance indicators against monitoring results is the key driver of the AEM process described in Section 8.2. Monitoring results are compared to performance indicators to determine if AEM measures are required to achieve desired outcomes.

8.2 ADAPTIVE ENVIRONMENTAL MANAGEMENT

To ensure that the Preferred Alternative, as presented in Chapter 6, functions as desired, an approach to ongoing management is required to continually fine tune LWC Project components and ensure long term LWC Project success. AEM provides a clear process for ongoing management of the LWC Project to ensure LWC Project objectives continue to be achieved through positive feedback mechanisms.

8.2.1 What is Adaptive Environmental Management?

The Canadian Environmental Assessment Agency defines AEM as a systematic process for continually improving environmental management practices by learning about their outcomes and applying that knowledge to improve the outcome. AEM allows for flexibility in project management so modifications and refinements can be incorporated throughout the project life cycle. AEM is fundamentally a way of incorporating learning through monitoring into a

feedback loop that enhances project outcomes. Undesirable environmental effects are identified early so that management interventions can be implemented promptly to avoid major problems before they occur and to maximize fulfillment of the LWC Project objectives.

Table 8.3 Examples of Environmental Performance Monitoring for Ecological Components of the LWC Project

Biophysical Component	Environmental Performance Monitoring
Habitat and Species	• identify trends of habitat and species targets through the post establishment phase. • evaluate habitat and species against intended outcomes and functions.
River and Wetland Form and Function	• observe impact of major flow events on river and wetland form and sediment accumulation.
Beach and Shoreline Stability	• evaluate whether beach materials are performing as intended by providing a dynamically stable shoreline. • evaluate whether the hardened nodes are performing as intended by anchoring the beach system and is remaining stable over a range of coastal conditions.
Wave Parameters, Circulation and Sediment Transport and Lake Levels	• document changes in wave parameters, circulation, sediment transport and lake levels over time to inform the need for management adjustments to streams, wetlands and shorelines.
Surface and Groundwater Quality	• Limited parameter water quality analysis for creek and near-shore waters of Lake Ontario to assess changes in water quality.

8.2.2 AEM Strategy for the LWC Project

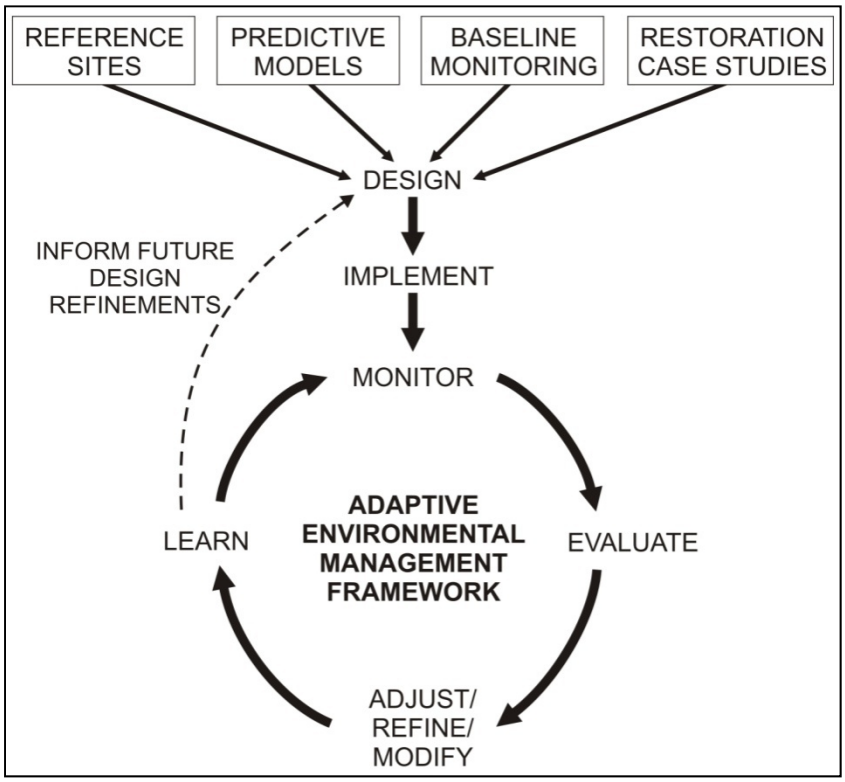
The outcome of naturalization projects depends on the interaction between the biological components with the underlying physical components that are created: terrain, soils, hydrology, and coastal processes which can all be modified by changes in climate; and how people use the LWC Project area and the surrounding areas.

An AEM strategy is desired for the LWC Project for a number of reasons including:

1. The need for a flexible strategy to address ecosystem response to changing environmental conditions and human use stressors during and following LWC Project construction;
2. The need to create the opportunity to maximize LWC Project benefits and minimize negative effects throughout the life of the LWC Project;
3. The need to respond to changes in local weather patterns and long term climate change that may alter lake water levels and the frequency and duration of inundation of the naturalized features, shoreline features; and/or the severity and frequency of extreme storm events; and,
4. The need to respond to changes or benefits related to future projects and planning initiatives (e.g. Inspiration Lakeview, LOISS) in the LWC Project Study Area and elsewhere in the Regional Study Area and to take advantage of enhancements that those projects may provide to this system.

Figure 8.2 outlines the AEM cycle in relation to the pre-design, construction and establishment phases of the LWC Project. The AEM cycle will be applied once the LWC Project is implemented and will inform future projects through a feedback mechanism from lessons learned. AEM is the ongoing cycle of monitoring, evaluation, adaptation and learning.

Figure 8.2 Relationship between LWC Project Design and AEM



The ability to affect the outcome of the LWC Project through monitoring and adaptation in response to stochastic events is of paramount importance. The AEM process offers the best process by which to achieve this flexibility. The purpose of AEM and associated monitoring programs is to increase the likelihood of meeting LWC Project goals despite uncertainty surrounding various LWC Project elements.

8.2.2.1 Monitoring and Evaluation within the LWC Project AEM Process

Monitoring is a key component of the adaptive management framework as it establishes conditions pre- and post- construction and allows the determination of which effects are occurring as a result of LWC Project activities. It identifies environmental changes that are occurring at various spatial scales that may affect LWC Project outcomes. Monitoring allows for the systematic testing of various systems or actions to assess their ability to achieve a desired

function or outcome. The key is to develop an understanding of not only which systems function as intended and which do not, but also which stressors are creating an impact to the system and the reasons for those impacts. The monitoring data that feeds into the AEM process will be robust and scientifically defensible, providing information that will maximize opportunities to achieve desired outcomes.

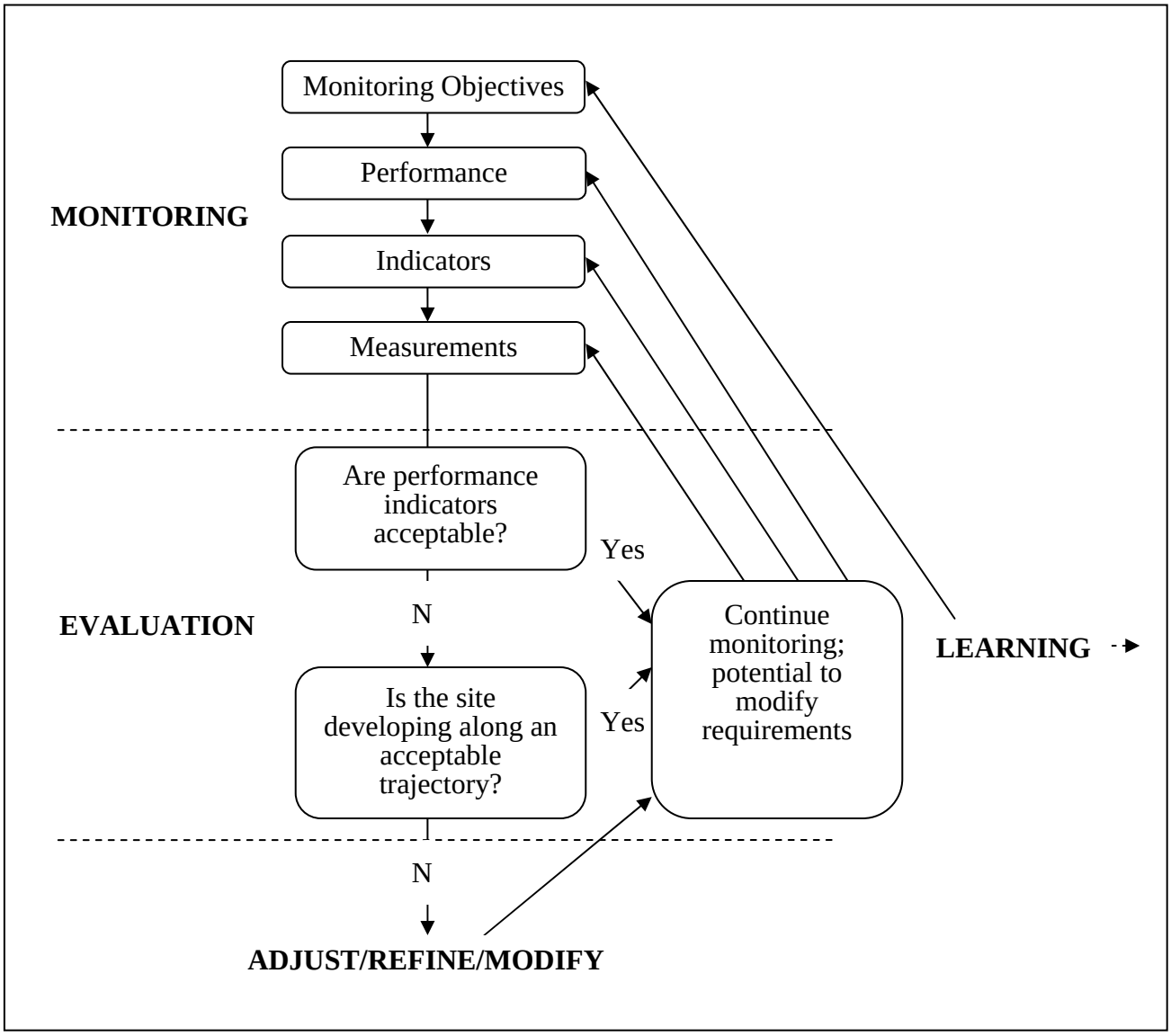
The achievement of LWC Project objectives is assessed by monitoring the system and evaluating the data against pre-defined performance indicators (see Section 8.1.4 and Figure 8.3). If the desired functions or outcomes are not achieved, the LWC Project features may need to be adapted. The objective is to maximize benefits in relation to the performance indicators (i.e. AEM will seek to maximize measured values related to indictors above the standards wherever possible).

The evaluation component of AEM will include specific triggers that will determine when management interventions will be required (see examples in Table 8.4). Evaluation of monitoring data provides the foundation for learning from the LWC Project. These lessons will inform required modifications to the monitoring program (i.e. increase or decrease in monitoring frequency; changes in performance indicators; identification of new objectives or better techniques) and modifications to the ecological models used for LWC Project design.

8.2.2.2 Adjustments, Refinements, Modifications within the LWC Project AEM Process

Adaptation (adjust, refine and/or modify) is about taking action to increase the likelihood of achieving LWC Project objectives. The purpose of an AEM strategy is to identify undesirable environmental effects early so management interventions can be implemented to avoid major problems before they occur. The environmental performance monitoring described in Section 8.1.3 will provide clear evidence of LWC Project outcomes during the establishment phase. Results from monitoring and evaluation will inform the need for adjustments, refinements or modifications to LWC Project design or operations. Table 8.4 provides examples of potential AEM triggers and possible adjustments, refinements, or modifications that could be implemented to address any identified problems. The specific triggers for adjustments, refinements or modifications and the specific management options will be refined during detailed design and included in an AEM work plan.

Figure 8.3 Monitoring and Evaluation within the AEM Cycle



8.2.2.3 Learning within the LWC Project AEM Process

One of the greatest benefits of the proposed AEM strategy is that it will allow for ongoing learning related to the outcomes of the LWC Project and future projects. Learning involves systematically documenting the results of monitoring, evaluation and adaptive measures, and providing lessons learned to a wide audience. CVC, TRCA, academia, other agencies and organizations and the global urban renewal community will benefit from an improved understanding of effective naturalization techniques established through the AEM strategy for the LWC Project. Monitoring programs will determine if predictive models provided accurate

information to appropriately inform design. Where monitoring reveals any inaccuracies within the predictive models, adjustments can be made for future designs.

Table 8.4 Potential AEM Triggers and Adaptive Measures for LWC Project Components

Project Component	Potential AEM Triggers	Potential Adjustments, Refinements or Modifications
Aquatic Habitat and Species	• Underperformance of desirable species recruitment to the area • Undesired spatial distribution of riparian or wetland ELC communities • Impairment of habitat features (sedimentation, ice scour, etc.) that significantly affects performance as intended / designed • Over representation of undesirable species (e.g., carp) • Impacts to created habitat and/or wildlife by people and/or pets	• Adjust / enhance aquatic habitat features and habitats to promote desired species composition • Expand monitoring to identify root causes of low species recruitment • Repair / re-establish habitat features • Refine invasive species (e.g., carp) management program • Adjust public access to habitat areas, bylaw changes, enforcement, etc. • Soil amelioration to improve planting success
Wetland Function	• Undesired hydroperiod in wetlands • Undesired species composition	• Adjust artificial levees (e.g., to avoid excess sedimentation, to retain water in flood events) • Modify flooding frequency, depth and/or duration • Modify vegetation composition using appropriate methods
Terrestrial/Wetland Habitat and Species	• Undesired species composition • Undesired spatial distribution of ELC communities • Inadequate species diversity • Cover not effectively controlling erosion • Recreation/human use causing degradation of habitat • In-adequate species diversity and abundance utilizing habitats as project desired	• Conduct vegetation management (herbicide application, manual removal, re-seeding, etc.) • Re-vegetate or adjust cover management system to control erosion • Reconfigure / manage human use patterns • Adjust / enhance wetland and terrestrial habitats as required to attract desired species or abundance
Shoreline Erosion	• Failure of revetment • Failure of islands • Excessive loss of beach material	• Address shoreline erosion and beach
Water Quality	• *E. Coli* measurements at beaches significantly higher than existing readings	• Source specific adaptive measures

Documentation of the monitoring, evaluation and adaptive measures described in this chapter will be used to inform similar projects that are undertaken in the future. Historically, ecological restoration projects have been poorly documented so the ability to learn from past successes and failures is limited (TRCA 2009). By applying the monitoring and adaptive management process outlined in this chapter, a robust database will be created that can be drawn upon for future projects related to waterfront revitalization and other naturalization efforts in Mississauga and the Greater Toronto Area.

This cycle of monitoring, evaluation, learning and adaptation will be applied to the LWC Project to respond to uncertainties and external influences related to the LWC Project and the environment. Examples of external influences are numerous with a prime example being climate. Climate change is expected to influence management of the LWC Project into the future, considering the duration of the build-out period, and the fact that the LWC Project will establish a new ecological system that will exist and evolve in perpetuity. Climate change may result in lower water levels in Lake Ontario which would influence coastal processes, recharge capabilities or inundation levels in the constructed wetlands, and may alter flow frequency in the creeks upstream. Monitoring the conditions over time following completion of LWC Project phases will allow CVC to respond to change by implementing appropriate AEM measures.

Further complications arise as a result of the build out period for the LWC Project that may extend over a number of years. This may trigger a management response to address changes to the environmental, social or economic context of the LWC Project.

9.0 EA AMENDMENT PROCESS

The LWC Project will take approximately 7-10 years to construct and will exist in perpetuity as part of the Mississauga/Toronto waterfront. The extended duration of construction may result in changes in circumstances (e.g. availability of fill, access options, adjustment of constructed features) that require design or scheduling modifications. The dynamism inherent with naturalization projects (see Chapter 8) suggest that there will likely be project modifications (i.e. adaptive measures) between the time of EA approval and the achievement of project objectives.

The AEM approach outlined in Chapter 8 will identify the need for project modifications where necessary. Adaptive measures and other changes identified during the period between EA approval and detailed design will be screened by the Region of Peel, TRCA and CVC to determine if additional regulatory approval (e.g. EA addendum, public consultation) is required before proceeding. To facilitate this process, a project-specific approach for assessing modifications to design or construction phasing has been established.

This chapter outlines the existing regulatory tools through which post-approval EA modifications can be made and describes the project specific approach that will be used for post approval review of modifications proposed for the LWC Project.

9.1 REGULATORY PROVISIONS FOR POST EA MODIFICATIONS

Section 11.4 of the *EA Act* includes provisions for amending a project design in situations where there is a change in circumstances or new information becomes available following EA approvals. Currently, post-approval modifications to a project occur on a project specific basis through amendment provisions included in an EA application or approval documents. The Minister of Environment can approve amendments to an approved undertaking when post-approval modifications are proposed where provisions for amendments have been included in the EA document.

Under the current Ontario *EA Act*, there is no formal process for review and assessment of post-approval modifications to the project. The existing mechanism where amendment provisions are built into the EA will be used to assess AEM measures and other design modifications proposed for the DMNP. Section 9.2 describes the process through which adaptive measures and design modifications will be submitted for approval.

9.2 LWC APPROACH TO POST EA MODIFICATIONS

Chapter 8 outlines a comprehensive monitoring program that will be implemented to guide the AEM strategy for the LWC Project. The AEM strategy may trigger proposed modifications to the project if monitoring results indicate that LWC Project Objectives are not being achieved. In addition to AEM measures, there may be design modifications that result from changing circumstances over the time between EA approval and the establishment phase for the LWC

Project. Thus, a clear and detailed method to identify the types of modifications that will trigger further environmental approval is needed.

Region of Peel, TRCA and CVC are responsible for reviewing monitoring data and identifying opportunities to alter or improve the project management, design and/or construction phasing. Region of Peel, TRCA and CVC may also identify modifications to project design or construction scheduling based on other factors such as fill availability, alternative access opportunities and project funding status. When a need to modify the project is identified, an internal effects assessment will be conducted to assess the impact of the modifications on desired project outcomes. Wherever possible, any proposed modifications will minimize adverse environmental effects and/or maximize Project benefits. This effects assessment will determine the need (or lack thereof) for further review by the MOE.

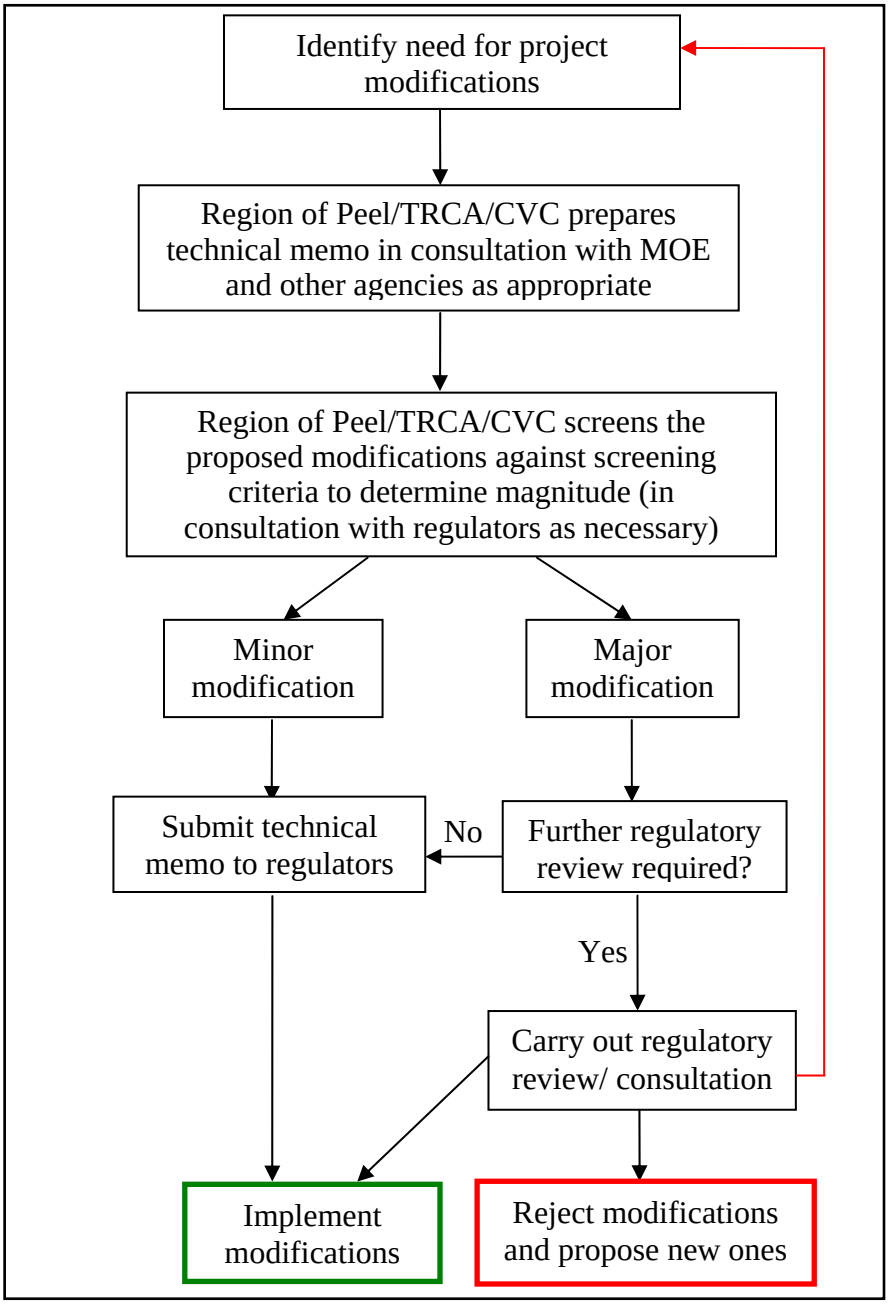
When project modifications are identified through the AEM process, Region of Peel, TRCA and CVC will prepare a technical memorandum to document the proposed modifications and their potential effects. The technical memo will draw upon the appropriate expertise to determine the effects of proposed modifications in relation to the predicted effects outlined in the EA. This will form the basis from which the magnitude (i.e. minor or major) of the proposed modifications can be determined. The technical memo will include the following information:

1. The need for modifications (e.g., new information from monitoring program, fill availability, etc.);
2. A description of the design and functions;
3. A description of the proposed modifications;
4. An assessment of how modifications will affect project outcomes;
5. An assessment of the predicted effects on the environment;
6. A comparison of the anticipated effects from proposed modifications to the effects predicted from the original design; and
7. A conclusion on the magnitude of the proposed modification (minor or major).

The technical memo will be circulated to the appropriate stakeholders, including MOE, for review. The technical memorandum will assess the magnitude of the proposed change in relation to the predicted effects outlined in the EA and the desired project outcomes by screening the proposed modifications against a set of criteria. The final determination of magnitude (major modification vs. minor modification) will be done in consultation with the MOE. If the proposed modification increases the likelihood of achieving desired project outcomes and/or does not change or reduces the environmental effects identified in the EA, then the modification will be considered minor and will not trigger any further action. Where there is the potential to increase the environmental effects identified in the EA, then the modification may be considered major and the appropriate regulatory body will determine the need for any additional regulatory requirements. In addition, there may be the need for additional consultation with the broader

stakeholder community. All technical memoranda and/or addenda will be submitted to the MOE for inclusion in the project files as part of the public record. Documentation and compliance with modification procedures and clarification of the assessment of any proposed changes may be subject to MOE review. Figure 9.1 summarizes the process for approving post-EA modifications.

Figure 9.1 Approval Process for Proposed Modifications to the LWC Project



9.2.1 Screening Criteria for Post EA Modification

Proposed project modifications will be screened against a set of criteria to determine the magnitude (minor or major) of modifications on the environmental effects predicted in the EA and on desired project outcomes. The screening questions that Region of Peel, TRCA and CVC will use to determine magnitude relate directly to the LWC Project Objectives identified in Chapter 1. Table 9.1 includes proposed screening criteria.

Table 9.1 Screening Criteria

Does the change alter the Serson or Applewood Creek in a way that flood conveyance may be affected?	
YES – CVC/Region of Peel in consultation with MOE will determine if further regulatory action is required	NO – proceed if all other screening criteria are met
Does the change reduce the spatial extent of the naturalized area?	
YES – CVC/Region of Peel in consultation with MOE will determine if further regulatory action is required.	NO – proceed if all other screening criteria are met
Does the change reduce the anticipated quality and/or function of the naturalized area?	
YES – CVC/Region of Peel in consultation with regulators will determine if further regulatory action is required.	NO – proceed if all other screening criteria are met
Does the change affect a condition of approval of the EA or any other approval or permit?	
YES – CVC/Region of Peel in consultation with regulators will determine if further regulatory action is required.	NO – proceed if all other screening criteria are met
For modifications to construction activities, is the change likely to cause an additional nuisance to businesses and recreational users?	
YES – CVC/Region of Peel in consultation with regulators will determine if further regulatory action is required.	NO – proceed if all other screening criteria are met
Does the change negatively affect water quality in the nearshore of Lake Ontario?	
YES – CVC/Region of Peel in consultation with regulators will determine if further regulatory action is required.	NO – proceed if all other screening criteria are met

This screening process will guide the preparation of a technical memorandum that CVC/Region of Peel will submit to the appropriate stakeholders for review (in consultation with the MOE). If the desired change results in an increase or worsening of the identified effects, further regulatory action may be required to assess the effects and identify appropriate mitigation. Any further regulatory action may require public consultation and/or broader agency consultation.

Table 9.2 provides examples of major vs. minor modifications. These are only provided as general examples and a final determination of magnitude will follow screening and consultation with the MOE.

Table 9.2 Examples of Minor vs. Major Project Modifications

Minor Modification	Major Modification
Adjustment or alteration of wetland control structures	Construction activity required outside of existing project boundary
Replanting/seeding vegetation in problem areas	OPG waterlots not being available for construction
Re-grading the landform	Moving the current location of the groyne structure to the north
Adjusting the layout of recreation trails	Selecting an alternate access route
Removing the groyne structure from the design	
Relocating the groyne further west	

Given this information, it is apparent that if modifications to the project do not worsen the predicted effects and do not represent a major perceived change from the perspective of the public and/or agencies, they can be implemented through the existing regulatory process.

10.0 CONSULTATION

10.1 CONSULTATION ON ENVIRONMENTAL ASSESSMENT

Chapter 10 documents the public, agency, First Nations and Métis consultation activities that took place as part of the LWC Project EA. Consultation for the LWC Project EA was coordinated according to the MOE Code of Practice: Consultation in Ontario's Environmental Assessment Process (MOE, 2007).

LWC Project consultation that took place in the Feasibility Study and Terms of Reference (ToR) stages of the LWC Project is detailed in the Record of Consultation that was submitted with the ToR in July of 2012 (Appendix A). This Record of Consultation provides details of consultation that took place between August 16, 2011 and December 12, 2013.

10.2 OBJECTIVES AND GENERAL METHODOLOGY

Throughout the LWC Project EA, the LWC Project team strove to provide appropriate, flexible and convenient opportunities for consultation and clear documentation of all consultation activities. CVC and the Region of Peel facilitated various and diverse opportunities for the public and interest groups to provide input into the LWC Project EA. Consultation initiatives brought stakeholders and community members together in a way that channeled community energy and fostered support for the LWC Project. Many interested parties were invited to and participated in the consultation activities outlined in this chapter.

The objectives of the LWC Project consultation program were to:

- Inform all interested members of the public and interest groups about the LWC Project and Alternative LWC Project Configurations in a user-friendly format;
- Consult with stakeholders and obtain feedback before decisions were made on the Alternative LWC Project Configurations, Evaluation Criteria and the selection of the Preferred Alternative;
- Involve the public and stakeholders directly to ensure concerns and ideas about the LWC Project were understood, including being responsive to comments and providing written responses to key issues; and
- Empower the public and stakeholders to inform and influence decision making throughout the LWC Project.

10.3 CONSULTATION MECHANISMS

10.3.1 Mandatory Notices and Other Notifications

10.3.1.1 Notice of Commencement and PIC #1

The Notice of Commencement (NoC), announcing the initiation of the LWC Project EA, was released January 2, 2013. This notice included LWC Project information and necessary EA process information. This notice also included information for the first Public Information Centre (PIC) for the EA, held January 22, 2013 (see Section 10.4.2 for further information), including a brief agenda, location and contact information. The NoC and PIC#1 notice were posted January 3, 4, 10, and 11 in three newspaper publications (Table 10.1), as well as released to the press via news release (Table 10.2). The NoC and PIC #1 notice also went out via email or mail to the LWC Project Contact List (Table 10.3). In addition, PIC #1 was posted on the City of Mississauga's home page (with a link to the CVC news release). Two City of Mississauga electronic readerboards, on Lakeshore Rd at the Pt. Credit Library, and at the access road to Lakefront Promenade Park, were also used to promote PIC #1. An event notice was also sent to the Inspiration Lakeview mailing list and publicized through Councillor Grimes' eNewsletter. The NoC/PIC #1 newspaper advertisement, flyer, news release and press pick up are included in Appendix E-1.

10.3.1.2 Notice of PIC #2

Notices for PIC #2, held April 3, 2013 (see Section 10.4.2 for further information), were posted on March 13 and 14, 2013 in three newspaper publications (Table 10.1). This notice included LWC Project information and necessary EA process information, a brief agenda, location and contact information. Notice of PIC #2 was also released to the press via news release on March 15, 2013 (Table 10.2). The PIC #2 notice went out via email or mail to the LWC Project Contact List (Table 10.3) on March 18, 19, and 20, 2013. PIC #2 was posted on the City of Mississauga's home page (with a link to the CVC news release). Two City of Mississauga electronic readerboards, on Lakeshore Rd at the Pt. Credit Library and at the access road to Lakefront Promenade Park, were also used to promote the event. An event notice was also sent to the Inspiration Lakeview mailing list and publicized through Councillor Grimes' eNewsletter. Appendix E-2 provides copies of the PIC #2 newspaper advertisement, flyer, news release and press pick up.

10.3.1.3 Notice of PIC #3

Notices of PIC #3, held November 20, 2013 (see Section 10.3 for further information), were posted in the Mississauga News (October 30, 2013), Mississauga News This Week (October 31, 2013) and the Etobicoke Guardian (October 31, 2013) (Table 10.1). In addition, 17,754 PIC #3

notice flyers were delivered to apartment and condo residents in the Longbranch community via Canada Post unaddressed admail. This notice included LWC Project information and necessary EA process information, a brief agenda, location and contact information. Notice of PIC #3 was also released to the press via news release on November 6, 2013 (Table 10.2). The PIC #3 notice went out via email or mail to the LWC Project Contact List (Table 10.3) on November 4, 2013. An event notice was also sent to the Inspiration Lakeview mailing list and publicized on Councillor Grimes' website on November 8, 2013. Appendix E-2 provides copies of the PIC #3 newspaper advertisement, flyer, news release and press pick up.

10.3.1.4 Notice of Submission of Draft EA

A Notice of Submission (NoS) for the Draft EA was posted on the LWC Project website on December 12, 2013, emailed/mailed to the LWC Project contact list (Table 10.3) on December 12, 2013, published in local newspapers (Table 10.1) on December 11 and 12, 2013, and publicized with a news release (Table 10.2) on December 12, 2013. In addition, approximately 17,754 NoS flyers were delivered to apartment and condo residents in the Longbranch community via Canada Post unaddressed admail. The Notice described the LWC Project and directed the public to locations where the draft EA could be reviewed. It included the dates of the review period, and the details of where comments could be sent. The NoS is included in Appendix E-1.

10.3.1.5 Notice of Submission of Final EA

A Notice of Submission (NoS) for the Final EA was posted on the LWC Project website on May 2, 2014, emailed/mailed to the LWC Project contact list (Table 10.3) on May 2, 2014, published in local newspapers (Table 10.1) on May 1, 2014 and publicized with a news release (Table 10.2) on May 2, 2014. In addition, approximately 17,754 NoS flyers were delivered to apartment and condo residents in the Longbranch community via Canada Post unaddressed admail. The Notice described the LWC Project and directed the public to locations where the final EA could be reviewed. It included the dates of the review period, and the details of where comments could be sent. The NoS is included in Appendix E-1.

Table 10.1 Mandatory Notice Publication Information

Notice	Media Outlet	Dates
Notice of Commencement and PIC #1	Mississauga News Mississauga News This Week Etobicoke Guardian	January 4 & January 11, 2013 January 3 & January 10, 2013 January 4 & January 11, 2013
PIC #2	Mississauga News Mississauga News This Week Etobicoke Guardian	March 13, 2013 March 14, 2013 March 14, 2013
PIC #3	Mississauga News Mississauga News This Week Etobicoke Guardian	October 30, 2013 October 31, 2013 October 31, 2013
Notice of Submission of Draft EA	Mississauga News Mississauga News This Week Etobicoke Guardian	December 11, 2013 December 12, 2013 December 12, 2013
Notice of Submission of Final EA	Mississauga News This Week Mississauga News Etobicoke Guardian	May 1, 2014 May 2, 2014 May 1, 2014

Table 10.2 News Releases, News Articles, and Other Media Items

News Releases & Radio Spot	Date	Media Responses	Date
News Release: Notice of Commencement and PIC #1	January 3, 2013 (Appendix E-1)	Article written by Mississauga News	January 3, 2013 (Appendix E-1)
Radio spot: Kate Hayes and Councillor Jim Tovey on The Haze FM	January 19, 2013 <http://www.thehazefm.ca/Podcast-page.html>	Article written by Mississauga News	January 23, 2013 (Appendix E-2)
News Release: PIC #2	March 15, 2013 (Appendix E-2)	Article written by Mississauga News	March 15, 2013 (Appendix E-1)
News Release: PIC #3	November 6, 2013 (Appendix E-2)	Article written by Mississauga News	April 4, 2013 (Appendix E-2)
News Release: Notice of Submission of Final EA	May 2, 2014 (Appendix E-1)	Article written by Mississauga Business Times	May 12, 2013 (Appendix E-2)
		Article written by Mississauga News	May 29, 2013 (Appendix E-2)
		Article by SNAP Etobicoke	Date unknown (Appendix E-2)
Article in Mississauga Life	January 2014 (Appendix E-2)	Article written by Mississauga News	November 6, 2013 (Appendix E-1)

Table 10.3 Notice Email / Mail Notifications

Notice	Contact (number of individuals on list/method of contact)	Date
Notice of Commencement and PIC #1	First Nations and Métis Communities (21) (mail)	December 28, 2012
	Agency Contacts and Technical Advisory Committee (58) (email)	January 2, 2013
	Local Businesses (57) (mail and email) and Landowners (4) (email)	Mail: December 28, 2012 Email: January 2, 2013
	Utility Companies (4) (email)	January 2, 2013
	Ministry of Environment (email)	January 2, 2013
	Community Liaison Committee (CLC) (21) (email)	January 2, 2013
	Interested Members of the Public (83) (email)	January 2, 2013
PIC #2	First Nations and Métis Communities (21) (mail and email)	Mail: March 19, 2013 Email: March 18, 2013
	Agency Contacts and Technical Advisory Committee (53) (email)	March 20, 2013
	Local Businesses (56) (mail and email) and Landowners (4) (email)	Mail: March 20, 2012 Email: March 20, 2013
	Utility Companies (4) (email)	March 20, 2013
	Ministry of Environment (email)	March 20, 2013
	CLC (23) (email)	March 20, 2013
	Interested Members of the Public (115) (email)	March 20, 2013
Notice #1 of Direct Community Engagement Sessions and Release of Supplementary Newsletter	CLC(23) (email)	July 25, 2013
	Interested Members of the Public (202) (email)	July 26 and 29, 2013
Notice #2 of Direct Community Engagement Sessions and Release of Supplementary Newsletter	First Nations and Métis Communities (21) (mail and email)	August 6, 2013
	CLC(23) (email)	August 12, 2013
	Interested Members of the Public (228) (email)	August 12, 2013

Table 10.3 Notice Email / Mail Notifications (Cont'd)

Notice	Contact (number of individuals on list/method of contact)	Date
PIC#3	First Nations and Métis Communities (21) (mail and email)	October 30, 2013
	Agency Contacts and Technical Advisory Committee (59) (email)	November 4, 2013
	Local Businesses (56) (mail and email) and Landowners (8) (mail and email)	October 31, 2013 and November 1, 2013
	Utility Companies (4) (email)	October 31, 2013
	Ministry of Environment (email)	November 4, 2013
	CLC(24) (email)	November 4, 2013
	Interested Members of the Public (347) (email)	November 4, 2013
Notice of Submission of Draft EA	First Nations and Métis Communities (21) (mail and email)	December 12, 2013
	Agency Contacts and Technical Advisory Committee (59) (email)	December 12, 2013
	Local Businesses (56) (mail and email) and Landowners (8) (mail and email)	December 12, 2013
	Utility Companies (4) (email)	December 12, 2013
	Ministry of Environment (email)	December 12, 2013
	CLC(24) (email)	December 12, 2013
	Interested Members of the Public (384) (email)	December 12, 2013
Notice of Submission of Final EA	First Nations and Métis Communities (21) (mail and email)	May 2, 2014
	Agency Contacts and Technical Advisory Committee (59) (email)	May 2, 2014
	Local Businesses (56) (mail and email) and Landowners (8) (mail and email)	May 2, 2014
	Utility Companies (4) (email)	May 2, 2014
	Ministry of Environment (email)	May 2, 2014
	CLC(24) (email)	May 2, 2014
	Interested Members of the Public (393) (email)	May 2, 2014

10.3.2 Website

A website for the LWC Project was developed at the beginning of the ToR stage. All information released to the public regarding the LWC Project has been posted on the LWC Project website (www.creditvalleyca.ca/lwc). This website contains a detailed description of the LWC Project, information on the EA process, as well as a number of document links.

Documents for public comment were posted on the LWC Project website in order to solicit input from community members not able to attend the PICs. Please see Appendix E-3 for website screenshots and statistics.

Documents available for download from the LWC Project website include:

- LWC Feasibility Study;
- Notice of Commencement;
- Notices of public meetings;
- PIC presentations;
- PIC agendas and workbooks with questions;
- Newsletters;
- Poster displays;
- Notes from public meetings;
- Final EA Terms of Reference including the Comment Disposition Table, Errata and Notice of Approval;
- Notice of Submission of Draft EA; and
- Notice of Submission of Final EA.

The website was provided in every media release, advertisement, official correspondence, and presentation given to the public regarding the LWC Project.

From the Notice of Commencement of the LWC Project EA on January 3, 2013, until November 25, 2013, the LWC Project website received 3,606 page views (Appendix E-3).

10.3.3 Newsletter

Newsletters were prepared ahead of each of the PICs in order to summarize LWC Project developments, convey key LWC Project information in written form, and provide the opportunity for attendees to distribute the newsletters to members of their community not able to attend PICs. Four newsletters were printed during the LWC Project EA. Newsletters were made available at the PICs, at various meetings and events in the Lakeview area, during direct

community outreach sessions and on the LWC Project website. Newsletters were also made available at various events attended by CVC's LOISS Project team. The newsletters are included in Appendix E-2.

10.4 PUBLIC CONSULTATION

10.4.1 Contact List

The public component of the LWC Project contact list consists of contacts acquired through the LWC Project public event and outreach sign-in sheets, as well as individuals who have contacted the LWC Project Consultation Coordinator directly via email or phone. The public list includes City of Toronto Ward 6 Councillor Mark Grimes, who represents part of the LWC Project Study Area, as well as Charles Souza, MPP for Mississauga South. Stella Ambler, MP for Mississauga South and Councillor Jim Tovey (City of Mississauga and Region of Peel) are on the LWC Project CLC.

The public contact list was used to provide direct email notices of pertinent LWC Project information, including consultation and outreach initiatives. At the time of submission there were 393 persons on the LWC Project contact list.

10.4.2 Public Information Centres

The primary method of providing information, collecting input, and collaborating with the public throughout the LWC Project EA, was through PICs. Three PICs were held during the LWC Project EA, with PIC notices sent to the LWC Project contact list and publicized in local papers at least two weeks ahead of each event (see section 10.3.1). PIC notice information, meeting notes, presentation materials, and workbooks are provided in E2. Table 10.4 provides an overview of the PICs for the LWC Project EA. Section 10.6 summarizes all comments received during the EA, including those from the PICs.

As participants arrived for PICs they were asked to sign-in and were provided with an agenda, workbook / comment sheet, newsletter, and PIC-specific information (Appendix E-2). PIC participants were invited to view information boards (Appendix E-2) and speak with the Proponents and the LWC Project team. Each PIC featured a presentation, with opportunities for members of the public to ask questions, make comments, and receive responses from the LWC Project team. PICs #1 and #2 featured facilitated discussion in which workbooks were filled out by small groups and individuals. The workbooks posed specific questions, providing a further opportunity for PIC participants to express their opinions and questions on the EA process and the LWC Project. At PICs #1 and #2, groups, and individuals, shared the ideas and comments generated during their discussions with the wider group. Individuals were invited to fill in their

own workbooks and hand them in to the LWC Project team, if they preferred. Information boards, newsletters, presentations, workbooks, and meeting notes were available for download from the LWC Project website for people who were not able to attend. Workbooks could be filled in and sent to the LWC Project Consultation Coordinator after each PIC.

PIC #1

PIC #1 was held at the Mississauga Senior's Centre at 1389 Cawthra Road in Mississauga, Ontario on January 22, 2013. PIC #1 focused on presenting, and receiving feedback on, the Alternative LWC Project Configurations and the Proposed Evaluation Criteria and Indicators.

PIC #2

PIC #2 was held at the Mississauga Senior's Centre on April 3, 2013. PIC #2 focused on presenting, and receiving feedback on, the evaluation of Alternative LWC Project Configurations.

PIC #3

PIC #3 was held at the Oasis Convention Centre at 1036 Lakeshore Road East, in Mississauga, Ontario on November 20, 2013. PIC #3 focused on presenting, and receiving feedback on, the refinements to the Preferred Alternative and the detailed assessment of the Preferred Alternative.

Table 10.4 Overview of PICs

Event	Date	Objectives	Attendance
PIC#1	January 22, 2013	• Providing EA status update. • Communicating how Alternative LWC Project Configurations were developed. • Discussing approach to comparative evaluation • Receiving public input and feedback on the: - Alternative LWC Project Configurations; - Objective based evaluation approach; - Evaluation Criteria and Indicators; and - Project and process to date.	83 members of the public
PIC#2	April 3, 2013	• Providing EA status update. • Communicating the results of the evaluation of Alternative LWC Project Configurations and presenting the Preferred Alternative. • Discussing elements of the Preferred Alternative that will be refined further. • Getting public input and feedback on the: - Results of the evaluation of Alternative LWC Project Configurations; - The components that should be considered as part of the refinement of the Preferred Alternative; and - LWC Project and process to date.	87 members of the public

Table 10.4 Overview of PICs (Cont'd)

Event	Date	Objectives	Attendance
PIC#3	November 20, 2013	• Providing EA status update. • Presenting the Preferred Alternative, as it was presented at PIC#2. • Communicating comments received following PIC #2 as well as expanded community consultation initiatives since PIC#2. • Presenting the Refined Preferred Alternative. • Discussing construction access routes, construction phasing and the detailed assessment of the Preferred Alternative, including: - Naturalization effects; - Access effects; - Compatibility effects; - Coordination effects; and - Fiscal viability effects. • Discussing the EA approval process.	131 members of the public

10.4.3 Community Liaison Committee

As part of the LWC Project consultation process, a CLC was established. The purpose of the CLC was to assist in reaching out to, and maintaining contact with, representative community residents, groups, associations, and organizations, and to provide community input and advice throughout the ToR and EA processes of the LWC Project. A key role of the CLC was to provide feedback on the content and format of presentation materials in advance of the PICs.

The CLC was composed of a broad range of community groups, associations, and organizations as well as community members and appointed representatives, and included:

- City of Mississauga Councillor – Ward 1;
- Credit River Anglers Association;
- Lakeview Estates Ratepayers' Association;
- Mississauga Bassmasters;
- Mississauga Canoe Club;
- Mississauga Cycling Advisory Committee;
- Mississauga Residents' Associations Network;
- Mississauga South Historical Association;
- MP – Mississauga South;
- Ontario Cycling Association
- Port Credit Business Improvement Area;
- Port Credit Salmon and Trout Association;

- Port Credit Village Residents Association;
- Port Credit Yacht Club;
- Rattray Marsh Protection Association;
- Sierra Club of Ontario, Peel Region;
- South Peel Naturalist Club;
- The City of Mississauga; and
- Town of Port Credit Association.

One CLC Ideas Workshop (October 9, 2012) and three official CLC meetings (January 14, March 19 and October 30, 2013), and a page-turn review of the Draft EA (January 16, 2014), took place during the EA stage of the LWC Project. Overviews of the CLC Ideas Workshop and CLC meetings #1, #2, and #3 are provided in Table 10.5. Appendix E-4 documents CLC meeting summary notes, agendas, comment summaries, and presentations. Questions and comments received during CLC meetings are summarized in Section 10.6.

The October, 2012 Ideas Workshop gathered input into the design of the Alternative LWC Project Configurations for the LWC Project. An information package with a workshop agenda was provided to the members of the CLC (D1.1). The meeting began with a presentation (Appendix E-4) and moved into a workshop during which the CLC gave their input on variations of the Alternative LWC Project Configurations that had been produced to date. Large print-outs of the Alternative LWC Project Configurations and markers were provided. CLC members were invited to draw their ideas on the print-outs, and give verbal comments to note-takers positioned throughout the workshop (Appendix E-4).

Three CLC meetings were held one to two weeks ahead of each of the PICs. The purpose of these meetings was to present the information that would be presented at the upcoming PIC to ensure that the content was comprehensive and appropriate given the community context. See Appendix E-4 for CLC meeting agendas, presentations and notes. Table 10.5 provides an overview of the CLC meetings.

Table 10.5 Overview of CLC Meetings

Event	Date	Objectives	Attendance
CLC Ideas Workshop	October 9, 2012	To provide an update on the status of the LWC Project. To obtain a review and feedback from the CLC regarding: • Alternative LWC Project Configurations drafted by the EA technical team; • The building blocks used to create those alternatives; and • The rationale for the size, character and extent of habitat, shoreline and recreational features.	13 CLC members
CLC Meeting #1	January 14, 2013	To: • Report back to the CLC on how their input was used to finalize the Alternative LWC Project Configurations; and • Discuss how the Alternative LWC Project Configurations will be evaluated.	16 CLC members
CLC Meeting #2	March 19, 2013	To: • Present the outcomes of the evaluation for each Alternative LWC Project Configurations; • Present the Preferred Alternative based on the evaluation; • Seek the CLC's input on the evaluation and the selection of the Preferred Alternative; and • Discuss potential refinements to the Preferred Alternative.	9 CLC members
CLC Meeting #3	October 30, 2013	To: • Communicate comments received following PIC #2 as well as expanded community consultation initiatives since PIC#2; • Present and discuss the Refined Preferred Alternative; • Present and discuss construction access routes, construction phasing and the detailed assessment of the Preferred Alternative, including: - Naturalization effects; - Access effects; - Compatibility effects; - Coordination effects; and - Fiscal viability effects.	12 CLC members
Page turn review of the Draft EA	January 16, 2014	To provide the CLC with an opportunity to review the Draft EA and provide comments as a group.	5 CLC members

10.4.4 Direct Community Engagement

In addition to PICs and CLC meetings, the LWC Project team undertook a variety of additional direct community engagement initiatives. The LWC Project team attended events over the summer at Lakeview Promenade Park, Marie Curtis Park, the Small Arms Building (Doors Open Mississauga), Lakeview Library, and the Royal Canadian Legion – Branch 101. At these outreach events, the LWC Project team spoke with community members about the LWC Project, handed out LWC Project newsletters, displayed LWC Project renderings, grew the LWC Project public contact list, and received comments and answered questions about the LWC Project. LWC Project team also responded to inquiries over telephone and via email. Table 10.6 provides a summary of direct community engagement initiatives. Comments and questions raised about the LWC Project by members of the public are reflected in the comment tracking matrix and can be found in Table 10.9.

Table 10.6 Summary of Direct Community Engagement Sessions

Date / Time / Location / Staff Present	Rationale for Selecting Location / Date / Time	Summary of Session and Outcomes
Date: Friday. June 14, 2013 **Time: 6 – 9 p.m.** **Date:** Saturday, June 15, 2013 **Time: 10 a.m. – 9 p.m.** **Location:** Port Credit Memorial Park **Staff Present:** CVC	The Mississauga Waterfront Festival is a multi-day outdoor festival, attracting thousands of people. CVC had a booth at the festival, promoting its conservation areas, urban environmental stewardship programs and shoreline-focused community outreach under LOISS.	A 10'x10' booth was set and attended to by CVC staff and volunteers. Information on shoreline-related projects, conservation areas, and urban environmental stewardship was disseminated. In addition, information about the LWC project was presented. Approximately 60 members of the public were engaged and 32 LWC Project newsletters were handed out. Most of the people welcomed the idea of creating new green space.
Date: Wednesday, July 24, 2013 **Time:** 1 - 4 p.m. **Location:** Marie Curtis Park East, north of the parking lot, near the playground. **Staff Present:** Alexis Wood, TRCA; Kenneth Dion, TRCA; and Tristan Knight, CVC	The date and time for the initial direct community engagement activity at Marie Curtis Park was selected based on a local mother's group meeting being held at the playground in the park.	The display was set-up adjacent to the Waterfront Trail crossing over Etobicoke Creek, at the north of the Marie Curtis Park East parking lot, near the playground. In order to maximize visual exposure and interaction with local community members, artistic renderings of the project were on display. LWC Project team members were on hand to discuss the LWC Project. A total of 26 members of the public spoke with LWC Project team members. Positive support for the LWC Project was received from 21 people. See Section 10.6 for a summary of comments. A total of 12 members of the public requested to be added to the LWC Project's distribution list.
Date: Saturday, July 27, 2013 **Time:** 9 a.m. - 12 p.m. **Location:** Marie Curtis Park East, north of the parking lot, near the playground. **Staff Present:** Alexis Wood, TRCA and Janice Hatton, Region of Peel	The date and time for the second direct community engagement activity at Marie Curtis Park was selected based on a large fundraising walk ("Paws on the Shore") being held along the Waterfront Trail.	The display was set-up adjacent to the Waterfront Trail crossing over Etobicoke Creek in order to maximize visual exposure and interaction with local community members. Artistic renderings of the LWC Project were on display. Two members of the LWC Project team were present to discuss the LWC Project A total of 36 members of the public stopped by the display. Positive support for the LWC Project was received from 31 people. Of the 5 members of the public who noted concerns regarding the project, 1 member of the public had also attended and submitted concerns as part of the July 24, 2013 outreach session at Marie Curtis Park (see section 10.6 for a summary of comments). A total of 19 members of the public requested to be added to the LWC Project's distribution list to be kept informed of LWC Project updates and notices of public meetings.

Table 10.6 Summary of Direct Community Engagement Sessions (Cont'd)

Date / Time / Location / Staff Present	Rationale for Selecting Location / Date / Time	Summary of Session and Outcomes
Date: Monday, August 5, 2013 **Time:** 1 - 4 p.m. **Location:** Marie Curtis Park East, north of the parking lot, near the playground. **Staff Present:** Alexis Wood, TRCA; Janice Hatton, Region of Peel; and Kate Hayes, CVC	The date and time for the third direct community engagement activity at Marie Curtis Park was selected in order to directly engage with the large crowds expected during a long weekend holiday Monday.	In response to concerns noted during the second outreach session on July 27, 2013, two 2'x3' signs were installed at the entrances to both the parking lots at Marie Curtis Park East and Marie Curtis Park West. The signs included dates and times for the expanded outreach activities being held at Marie Curtis Park and Lakefront Promenade Park, as well as the aerial planform rendering of the LWC Project to provide context for those unfamiliar with the LWC Project. The signs were installed on Thursday, August 1st in advance of the direct community engagement session in order to advise the public of the expanded outreach activities. The display was set-up adjacent to the Waterfront Trail crossing over Etobicoke Creek in order to maximize visual exposure and interaction with local community members. Artistic renderings of the LWC Project were on display. LWC Project team members were present to discuss the LWC Project. A total of 69 members of the public spoke with LWC Project team members. Positive support for the LWC Project was received from 65 members of the public. Of the 4 members of the public who noted concerns, 2 had also attended and submitted concerns as part of the July 27, 2013 outreach session at Marie Curtis Park (see section 10.6 for a summary of comments). A total of 24 members of the public requested to be added to the Project's distribution list to be kept informed of Project updates and notices of Public Meetings.
Date: Sunday, August 18, 2013 **Time:** 1 - 4 p.m. **Location:** Marie Curtis Park East, north of the parking lot, near the playground. **Staff Present:** Alexis Wood, TRCA and Janice Hatton, Region of Peel	The date and time for the fourth direct community engagement activity at Marie Curtis Park was selected in order to directly engage with the large crowds common during summer weekends.	In response to concerns noted during the second outreach session on July 27, 2013, two 2'x3' signs were installed at the entrances to both the parking lots at Marie Curtis Park East and Marie Curtis Park West. The signs included dates and times for the expanded outreach activities being held at Marie Curtis Park and Lakefront Promenade Park, as well as the aerial planform rendering of the Project to provide context for those unfamiliar with the Project. The signs were installed on Thursday, August 15, 2013 in advance of the direct community engagement session in order to advise the public of the expanded outreach activities.

Table 10.6 Summary of Direct Community Engagement Sessions (Cont'd)

Date / Time / Location / Staff Present	Rationale for Selecting Location / Date / Time	Summary of Session and Outcomes
		The display was set-up adjacent to the Waterfront Trail crossing over Etobicoke Creek in order to maximize visual exposure and interaction with local community members. Artistic renderings of the Project were on display. Two members of the LWC Project team were present to discuss the LWC Project. A total of 41 members of the public stopped by the display. Positive support for the LWC Project was received from 33 members of the public. Of the 8 members of the public who noted concerns regarding the project, 1 member of the public had also attended and submitted concerns as part of the July 27, 2013 outreach session at Marie Curtis Park, and 1 member of the public had also attended and submitted concerns as part of the August 5, 2013 outreach session at Marie Curtis Park (see section 10.6 for a summary of comments). A total of 19 members of the public requested to be added to the Project's distribution list to be kept informed of Project updates and notices of Public Meetings.
Date: Saturday, August 24, 2013 **Time:** 11:30 a.m. - 3 p.m. **Location:** Lakefront Promenade Park **Staff Present:** Jon McMull, CVC	The date and time for the third direct community engagement activity at Lakefront Promenade Park was selected based on a large weekend crowd drawn to the splash pad. The tent displays were set-up adjacent to the splash pad in order to maximize visual exposure and interaction with local community members. Two signs were set-up near the splash pad over a week prior advise visitors of the information display.	The display was set up between the parking lot and splash pad. Artistic renderings of the LWC Project were on display. One member of the LWC Project Team, as well as Councillor Jim Tovey, were present to discuss the LWC Project. A total of 16 members of the public stopped by the display. All 16 members of the public indicated their support for the LWC Project.
Date: Saturday September 14, 2013 **Time:** 10:00 a.m. - 2:00 p.m. **Location:** Lakeview Library **Staff Present:** Kate Hayes	Attendance at Lakeview Ratepayer's Association "community event" was suggested by a CLC member in response to the Project team's request for suggestions for outreach opportunities.	The display was set-up adjacent to the Lakeview Library parking lot in order to maximize visual exposure and interaction with local community members. Artistic renderings of the project were on display, as well as an aerial planform rendering of the Project. One member of the Project Team was present to discuss the Project with the local community and answer questions. Between 10 a.m. and 2 p.m. approximately 50-60 members of the public demonstrated interest in the project. Comments received were overwhelmingly positive in support of the LWC Project. Some concern was expressed about recent flooding in the community and questions centered on how the LWC Project might help to mitigate stormwater, and what

Table 10.6 Summary of Direct Community Engagement Sessions (Cont'd)

Date / Time / Location / Staff Present	Rationale for Selecting Location / Date / Time	Summary of Session and Outcomes
		additional measures were being taken by the City and CVC to assist with stormwater management. Comments and questions raised about the LWC Project by members of the public are reflected in the comment tracking matrix and can be found in section 10.6.
Date: September 28 **Time:** 12:00 - 4:00 p.m. **Location:** Doors Open Mississauga at the Small Arms Building **Staff Present:** Ken Dion	Attendance at Doors Open Mississauga at the Small Arms Building was suggested by a CLC member in response to the Project team's request for suggestions for outreach opportunities.	The LWC Project information display was set up adjacent to the Inspiration Lakeview and Hanlan Feedermain tables. Artistic renderings of the LWC Project were on display, as well as an aerial planform rendering of the LWC Project. Approximately 1200 people attended the Doors Open event. Several hundred visitors walked by the LWC Project information display. LWC Project staff spoke with approximately 30-40 people. Every individual who conversed with LWC Project staff expressed support for the LWC Project.
Date: October 17 **Time:** 7:00 - 9:00 p.m. **Location:** Royal Canadian Legion – Branch 101 **Staff Present:** Ken Dion, Alexis Wood, Michael Charendoff, TRCA; Kate Hayes, Scott Sampson, CVC; Janice Hatton RoP; Anneliese Grieve, Kyle Hunt, SENES; Milo Sturm, Shoreplan	Neighbouring Councillors Jim Tovey, Mississauga Ward 1, and Mark Grimes, Toronto Ward 6, co-hosted an informational open house to present the plans of the LWC Project. The Open House was held at the Royal Canadian Legion Branch 101, 3850 Lake Shore Boulevard West in Toronto, Ontario.	Approximately 60 members of the public attended the Open House. The public was invited to review information boards and discuss their comments and questions with the LWC Project team. The overwhelming majority of attendees expressed support for the LWC Project; however, some attendees expressed concern about potential impacts to the beach at Marie Curtis Park. Many of those who expressed concern had previously registered their concern at PICs, outreach initiatives, and via email.

In addition to the above-noted direct community engagement sessions, LWC Project staff met with one member of the public on-site, on July 5, to discuss their concerns and questions. The minutes from this meeting can be found in Appendix E-5. In addition, the LWC Project team, as well as staff from the City of Toronto and the office of Councillor Mark Grimes, met with nine members of the public on August 21, 2013 from 7:00 – 9:30 p.m. at the Royal Canadian Legion - Branch 101, located at 3850 Lake Shore Blvd. The purpose of this meeting was to discuss the status of the LWC Project as well as options to maximize broad public input in advance of two public meetings: 1) an informational open house, hosted by Councillors Tovey and Grimes, on

September 17, 2013; and 2) PIC #3, held November 20, 2013. Complete minutes of the meeting on August 21, 2013 can be found in Appendix E-5. Notes from the informational open house on September 17, 2013, can be found in Appendix E-5.

10.5 LOCAL BUSINESSES AND LANDOWNERS

The LWC Project team consulted with the businesses and landowners located south of Lakeshore Road and east of Lakefront Promenade to Etobicoke Creek. A total of 53 businesses and 4 additional landowners were kept apprised of the LWC Project throughout the EA (see Appendix E-6).

Businesses and landowners within the LWC Project Study Area were contacted a total of five times during the EA (Table 10.7). Correspondence included an open invitation to meet with the LWC Project team to discuss the LWC Project in greater detail.

Table 10.7 LWC Project Notifications to Businesses and Landowners

Notification	Date
NoC and PIC #1	Mail: December 28, 2012 Email: January 2, 2013
Notice of PIC #2	Mail: March 20, 2013 Email: March 20, 2013
Notice of PIC #3	Mail: October 31 and November 1, 2013 Email: October 31, 2013
Notice of Submission of Draft EA	December 12, 2013
Notice of Submission of Final EA	May 2, 2014

In addition, the following utility companies have infrastructure located south of Lakeshore Road and east of Lakefront Promenade to Etobicoke Creek:

- Enersource Hydro Mississauga;
- Enbridge Gas;
- Bell Canada; and
- Rogers Cable.

These utilities were provided with the same information as the local businesses and landowners (Table 10.7) and an open invitation to meet with the LWC Project team to discuss the LWC Project in greater detail. To date, only one response has been received from the utilities and local businesses and landowners (Table 10.8).

Table 10.8 Responses from Local Businesses, Landowners and Utilities

Business, Landowner or Utility	Method of Communication	Date	Summary of Key Issues
Enbridge Gas	Email	January 7, 2013	Enbridge Gas notified the LWC Project team that as of January 7, 2013, they did not have concerns or comments regarding the LWC Project. Jim Arnott of Enbridge Gas asked to be added to the mailing list. (Appendix E-6)

10.6 SUMMARY OF PUBLIC COMMENTS

The following matrix provides a summary of comments and issues received during PICs, CLC meetings, and other sources. The matrix is not an exhaustive account of all comments received; rather it is a summary of those comments received during the LWC Project EA.

Table 10.9 Summary of Comments and Responses

Issue	Comments and Questions Received	Responses
Accessibility	Ensure that the park is designed to be used year round.	It is our intention to introduce design elements that will allow the public to enjoy the park year-round.
	Consider access to the project land area over the next several years and during construction.	The LWC Project Study Area will be a construction site over the next several years so public access must be controlled in accordance with relevant legislation and by-laws. Access will be permitted once construction activities have been completed. Please see Chapter 6 of the EA.
	Consider accessibility to the park to ensure everyone can enjoy it.	The multi-use trail will be fully accessible. Please see Chapter 6 of the EA.
	Will the groyne separating the existing Marie Curtis West beach from new area (transition zone) be accessible for people to be able to walk out on it?	Yes
	Concern over not being able to use the park for years during construction.	It is anticipated that construction will have minimal effects on existing park use with the exception of the Waterfront Trail which will be rerouted during construction. However, the existing trail will continue to be accessible by the public when construction activities have shut down for the day during weekday evenings and at night.
	Consider providing access to the middle of the LWC Park and protecting viewscapes.	Currently the EA identifies the primary trail access. However, during the detailed design phase of the LWC Project we will look at secondary trails, including the forested area and other areas away from the shoreline. We are trying to balance the use of the park to ensure that people can have a range of experiences recognizing that it is also a natural area that should provide safe areas for birds to reproduce and for humans to co-exist with the ecology of the park.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Accessibility		With respect to viewscapes, an important element of the EA was to conduct view shed analysis to ensure important views are maintained, including the view of the City of Toronto skyline from the Ontario Power Generation piers.
	Consider making the temporary trail accessible for cycling in addition to pedestrians. Also consider increasing access to the waterfront during the construction phase.	The routed Waterfront Trail during the period of construction along the south side of Lakeshore Road will be accessible to pedestrians and cyclists. We are also contemplating construction viewing opportunities along the south side of the WWTF by establishing a tertiary mown trail with extensive fencing to maintain security for the construction site and WWTF. Alternative viewing areas will be contemplated at detailed design as well.
[redacted]		
Algae	Consider algae growth in the embayment area.	Algae growth and circulation has been considered during the development of Alternatives. The primary issue associated with algae growth is nutrient levels in the water column (which is high throughout Lake Ontario), and suitable hard substrates from which algae could become attached. In discussions with the ecologists, and coastal engineers, sheltered areas, such as embayments generally provide conditions suitable for the establishment of macrophyte submergent vegetation, such as milfoil. While these types of plants are known to be a nuisance for motorized watercraft, they do provide shelter for fish and generally reduce the amount of algae growth by competing against them for nutrient uptake. For the beach areas, it is likely that algae growing offshore will end up being deposited on the beach areas, similar to other beaches on Lake Ontario. The revetment while providing a surface for algae to attach to, does not provide a shoreline conducive for the build-up of detached algae, thus allowing algae to continue on around the landform.
	Consider a hybrid of the embayment and the Island Alternatives (Island Beach A, Island Beach B, Island Beach C with) a break through option to alleviate algae growth concerns.	Please see Chapter 6 of the EA for a discussion of the preferred alternative.
	The new landform will create an area where there will be very little movement of water, resulting in a build-up of algae. On the west side of Etobicoke Creek, there is a breakwater which is causing the same effect. It also happens at Colonel Sam Smith Park.	Water circulation and water quality modeling was completed. The results indicate that there will be no significant changes from existing conditions. Algae is a regional issue which the LWC Project cannot address. Detailed videos of the lake bottom depict "algae forests" offshore along the Project Study Area.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Algae	The videos are not correct; the lake bottom is all sand from Etobicoke Creek to the eastern OPG pier. Currently, the area in question is wide open and the algae tends to wash out. As the algae will attach to the cobble more so than sand, this area has much less algae than Mimico or other areas in Toronto. There is concern that this Project will change that dynamic.	Our studies indicate that there will be little change to existing coastal processes.
	Does the City of Mississauga rake the algae from their jurisdiction?	CVC and the Region are currently testing equipment to rake algae, although the results indicate that they are not very effective given the regional issue of algae.
	You keep giving us assurances that the modeling indicates that the LWC Project won't exasperate the algae issue. However, there are features of this project that are categorically similar to Colonel Sam Smith Park, where the build-up of algae and organic material renders the shoreline completely unusable.	Noted. Details regarding water circulation and water quality modeling will be available as part of the EA.
	What will prevent the wetlands from becoming stinking ponds of algae?	Nutrient loads within the wetlands will be taken up by wetland vegetation. Experience with wetland restoration projects throughout the GTA suggest algae will not be an issue, provided the design maximizes aeration and water circulation in the wetland.
Beaches	Provide a more precise definition of what is meant by 'beach'.	A beach is a landform, defined as a collection of loose particles such as sand, gravel, pebbles, shingles or cobbles, that is exposed to, and reworked by, wave action and currents. In the case of the LWC Project, the easternmost beach area, overlapping with Marie Curtis Park West beach, the materials will range in size from 0.5 to 4 inches in diameter, with parts of the beach likely being covered in sand for much of the summer, as is currently experienced. For the remaining portions of the proposed beach, beach materials will be round river stone, ranging in size from 4 to 8 inches in diameter. Please see section 3.2.2.2 of the EA for a discussion of beaches.
	Disappointment was expressed by a number of PIC #2 participants about the 'beach' component of the Preferred Alternative Island C not being able to support a sandy area.	The preferred alternative, Island C, has been refined to maximize the amount of sand beach area retained. Please see Chapter 6 of the EA.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Beaches	Is there evidence to refute a comment shared by a Long Branch resident that the beach in question may be the last remaining "Natural beach" in the Toronto Area?	There are many natural beaches on Lake Ontario and other Great Lakes that consist of rocks that are significantly larger than sand. As such, when the creation of a cobble beach in the area is proposed, these are materials that would be deemed "natural" in the context for the area – the beach at Rattray Marshes, for example. There are also several remaining sand beaches in the Toronto area. The most extensive is Woodbine Beach in Toronto which was formed through the deposition of sand eroded from the Scarborough Bluffs. Other sand beaches can be found on the Toronto Islands, Bluffers Park and at the mouth of the Rouge River. More locally, sand beaches are found along the City of Mississauga shoreline at the Suncor Energy site and Fusion Park near Oakville.
	Concerned with the loss of sand beach and not clear on the reasons behind this. Request for clarification for reasons for change and request confirmation that community concerns are being listened to.	The preferred alternative, Island C, has been refined to maximize the amount of sand beach area retained. Please see Chapter 6 of the EA.
	Can you please give me an estimate of the amount of beach that will be removed? It looks like there is about 30 feet of sand beach to the west of Applewood Creek. How much sand beach will be removed or altered on the east side of that small creek.	The preferred alternative, Island C, has been refined to maximize the amount of sand beach area retained. Please see Chapter 6 of the EA.
	I am glad that the Lakeview neighbourhood in Mississauga will get a natural waterfront park but not at the expense of an existing sand beach on the Toronto side.	The preferred alternative, Island C, has been refined to maximize the amount of sand beach area retained. Please see Chapter 6 of the EA.
	How much of the sand beach currently at Marie Curtis Park will be lost?	The preferred alternative, Island C, has been refined to maximize the amount of sand beach area retained. Please see Chapter 6 of the EA.
	Need to consider the remnant sand beach in front of the WWTF.	Comment noted.
	A member of the public thinks that not enough sand beach will be retained and wants the entire shoreline to be beach, or pockets of beach left behind the islands. Does not believe the coastal studies regarding the need for cobble and not sand	Noted.
	How will this affect beach conditions at Marie Curtis Park beach east?	There are no anticipated changes to Marie Curtis Park East

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Beaches	The sand beach in the area has been here for 200 years, why do we now need cobble? Would like to see the design changed to retain even more of the sand beach.	Comment noted. Please see Chapter 6 of the EA for a discussion of the preferred alternative.
	People lounge on cobble beaches in Nice. The cobble beach feature is not an issue.	Noted.
	Why can't the new beaches be sand instead of cobble?	The further the land base extends into the lake, the stronger the wave energy. The beach material must be appropriately sized to withstand that energy and be stable in the long-term.
	The beaches behind the headlands at Colonel Sam Smith Park are oriented in the same direction as these Alternatives; however, the cobble is much smaller.	When Colonel Sam Smith Park was created, the cobble material was the same size as proposed in the LWC Project. Over time, the wave energy has ground them down to the small size you see now. TRCA has also gone back and completed refinements to the beaches at Colonel Sam Smith Park. To provide another example, east of Rattray marsh is an area known as Brick Beach. When this beach was constructed, the beach material was large bricks. Over time, the wave energy has turned these bricks into small cobble stones.
	The LWC Project Team must understand that local residents are already concerned regarding loss of beach along Marie Curtis Park beach east. This proposed loss of beach on the west side only adds to the overall extent of beach lost.	Feedback received from the Parks Supervisor is that the existing sand beach along Marie Curtis Park east and west is not naturally maintained. The Parks Supervisor regularly places sand along the maintained sections of the east and west beaches.
	There is a risk that the public will not tolerate the loss of the beach.	Comment noted.
	We love the project and the opportunity. We still are not overly happy to see the effects on the west end of the beach at Marie Curtis Park and the remnant beach south of the Treatment Plant. And yes I am aware that I am not supposed to be there. But it is lovely, despite some of the extra-curricular activities that occur over there.	Comment noted. We have minimized the changes to the beach at Marie Curtis Park West. Please see Chapter 6 of the EA.
	Connecting the waterfront trail and getting it off the Lakeshore road is the most anticipated goal. The only concern is that the beach of M.C. Park will not be adversely affected by the proposal.	Comment noted

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Beaches	Will the hidden beach near the water plant area that is accessible by water only completely disappear?	This pocket of sand beach will be transformed into a wetland area tied to Applewood Creek. The depth of water at the new constructed open coast shoreline will be approximately 5 metres deep, thus preventing the reestablishment of shallow sandy conditions found to the south of the WWTF. This is why this area will have larger cobble stones as opposed to sand to ensure it can withstand the higher wave energy resulting from deeper water conditions.
Benefits	Concern over habitat loss.	The LWC project will create new wildlife habitat creating a net positive increase in habitat.
	How will this project help the environment?	The goal of the LWC Project is to create a new natural park that will establish ecological habitat and public linkages on the eastern Mississauga waterfront. Currently, the shoreline is approximately 80% hardened. There is poor upland habitat and very little connection along the shoreline, and past stone hooking activity has resulted in the loss of near shore fish habitat. The Preferred Alternative of the LWC Project will create terrestrial and wetland habitat, including meadow; beach; forest; wetland; treed swamp; and rocky island habitat.
	How will this project benefit City of Toronto residents?	The LWC Project provides a number of benefits to residents of Toronto, Mississauga, and beyond. The Project will ultimately provide a connection along the eastern Mississauga waterfront, from Marie Curtis Park to Lakefront Promenade Park. Ultimately, members of the public will be able to walk along the water's edge from Marie Curtis Park to Lakefront Promenade Park and use the new waterfront park for passive recreational activities such as: bird watching; nature appreciation; fishing; and hiking; as well as retain the current uses found at Marie Curtis Park. In addition, the project will provide significant indirect enhancements to the public by directly improving the quality of habitat for regional fish and wildlife populations along the shores of Lake Ontario. In particular, the feature offers a unique opportunity to create much needed habitat for migratory species including birds and butterflies by improving the amount and the quality of "stop-over" habitat as various species make their way over Lake Ontario. Habitat loss and degradation is a leading cause of declines in wildlife both in Ontario and globally, and the Lake Ontario shoreline is part of a major migratory pathway for species that breed in Canada and overwinter in the southern United States and both Central and South America.
	Will this improve fishing and fish habitat?	Yes. Please see Chapter 7 of the EA.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Configuration of LWC Project	Based on what is being proposed, what will happen at the interface of Applewood Creek and the Lake Ontario?	Please see Chapter 6 of the EA for a description of this interface.
	Consider the aesthetics of the islands.	Islands play a crucial role in maintaining beach stability in a very harsh environment. Further, we had received direction from the community that we should not create conditions that would be conducive for establishing new cormorant communities. This directive requires us to ensure that the islands remain low-lying, so that large waves can regularly overtop the structures, thus preventing the establishment of isolated trees, which are desired by cormorants for nesting purposes. The resulting rocky islands will not produce a substantial break in sight lines from the beaches given their distance from shore and low-lying nature during most lake level conditions.
	Consider opportunities for including more sand in the terrestrial area.	This statement relates to the stated desire for making the proposed cobble beaches more "people" friendly. The challenge of adding sand to these beaches is that the wave climate is too severe to maintain sand in place on the beaches. This would require expensive and frequent sand replenishment programs that are not sustainable. Alternatively, sand could be placed above the high water marks of the beaches outside of the zone of wave influence. However, without the influence of wave action to move the sand around, these sand areas will become vegetated over a couple of seasons and will simply take on the form of the surrounding meadow areas of the park.
	Will the two wetlands both be permanently open to Lake Ontario or is it the intent to have a more fluctuating situation where they open and close depending on water levels, wave action etc. like Rattray Marsh?	Wetlands may or may not be periodically closed off from direct effects from Lake Ontario due to movement of materials at the mouths of each creek. Please see Chapter 6 of the EA.
	Are the islands associated with Island Beach A, Island Beach B, and Island Beach C Alternatives for fish habitat only, or are they needed to protect the beach?	The islands in the Island Beach A, Island Beach B, and Island Beach C Alternatives are essential for beaches to remain in place otherwise the cobbles proposed for the beaches would be lost. The islands can be designed to have enhanced fish habitat function as well.
	Consider including more sand as part of the Preferred Alternative Island C.	Please see Chapter 6 of the EA. We have minimized the effect of the preferred alternative on the sand beach to the extent possible.
	Can a wall be constructed to keep this project in City of Mississauga jurisdiction?	The intent of this project is to facilitate public and wildlife access to the water's edge; therefore, a wall would contradict this intent.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Configuration of LWC Project	I do not want this to end up like Colonel Sam Smith Park, with sludge build-up.	Noted.
	Consider minimizing the amount of standing water in the treed swamp.	With respect to the treed swamp (i.e. Forest), the water located in this area will be locally generated from the hills and the forested area. The design of this swamp will be such that it will likely be wet on the bottom during the spring after the snowmelt and after rain events. For the remaining parts of the year, the wetland is not likely to contain standing water. This kind of wetland is referred to as having 'ephemerally wet swamp conditions'.
	Where will the rivers go?	Please see Chapter 6 of the EA.
	Ensure this project does not end up looking like Humber Bay Shores.	Noted.
	Ensure the beach face of the new waterfront park does not look like Colonel Sam Smith Park (i.e., protruding metal rebar).	Noted
	Will the rocky islands be submerged at times?	The islands are designed to be low-lying, which will allow waves to overtop them frequently during storms but will remain emergent under most lake level conditions.
	These islands are being built to a certain height, but Lake Ontario water levels are getting lower.	Lake Ontario water levels are regulated through control structures at each end. As such, it is not anticipated to see water levels drop significantly as is experienced in Georgian Bay.
	How far from shore will these islands be, and how deep is the water in this area? There are concerns regarding the build-up of algae between the shoreline and islands.	The islands are approximately 40-m to 50-m from the shoreline and the water is approximately 3-m to 4-m deep in this area. Water circulation and water quality modeling was completed in this area, and the results indicate that there was little anticipated change in circulation or water quality as compared to the existing conditions.
	What would prevent moving the groyne father west and creating a thinner band of new land in front of the WWTF? Every inch of existing sand beach that can be retained is a benefit.	While there may be still some opportunity to move the groyne farther west, there is limits as to how far this can occur given the intent of the LWC Project to allow sufficient space for a wetland complex associated with Applewood Creek; create a multi-use trail; screen the WWTF; and create views to City of Toronto and back to the Inspiration Lakeview site. These are all elements which the public and agencies have indicated a desire for. Please see Chapter 6 of the EA.
	I think most people would trade off a narrower band of land at the eastern extent of the project for more sand beach.	Comment noted.
	How was the determination of the new beach and the layout of the large promontory at the west end with the armour stone wall selected?	Please see Chapter 5 of the EA for a discussion of how the alternatives were developed.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Configuration of LWC Project	Unnatural man-made islands will be a water & boating hazard if too low, if they are too high can be offensive due to unplanned use, vegetation growth and blocked views	The islands are a required component to maintain the stability of the beach. The islands also provide opportunities for additional habitat diversity.
	The groyne will make algae problems worse.	Algae is a lake-wide issue and is not anticipated to be improved or exacerbated as a result of the Preferred Alternative.
	How far does the groyne extend into the Lake Ontario? What is the purpose of the groyne?	It extends approximately 20 to 30 m offshore. The purpose of the groyne is to prevent the larger materials (e.g., cobbles) from mixing with finer materials (e.g. sand) to the east in Marie Curtis Park.
Construction	Consider effect on roads and local area due to the transportation of the fill and other construction activities.	The effect on transportation of fill and other construction activities on local traffic and roads has been considered as part of the detailed assessment of the Preferred Alternative. Please see Chapter 7 of the EA.
	Will the construction plan happen soon?	Construction of the LWC Project will start in late 2014, subject to receiving all necessary permits.
	How will construction vehicles access the site? Can construction proceed from west to east, such that it begins in Mississauga and finishes with the piece within City of Toronto jurisdiction?	At the moment, the LWC Project does not have access to enter the site from the OPG Lakeview site or the GE Booth WWTF, which would have allowed for construction to proceed from west to east. As such, construction access is contemplated through the Arsenal Lands and south to the lake, near Applewood Creek. With this access point, construction activities must proceed from east to west.
	Concern regarding removal of trees in Marie Curtis Park	The route selected through the Arsenal Lands minimizes to the extent possible, the number of trees requiring removal. The LWC Project Team will continue to explore opportunities to access the waterfront from the OPG Lands, thereby removing these effects.
	Access routes through OPG is best.	Comment noted.
	Minimize environmental pollution during construction caused by: • Noise {including but very much not limited to truck reversing noises amplified by open water};, • Dust; • Visual {construction sites can be made less visually challenged when there is a binding vision to significantly reduce the visual challenge plus effective implementation}; and • Trucking routes within existing public parks.	Please see Chapter 7 of the EA.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Construction	I am very concerned about the amount of truck traffic, as well as the duration of the Project. The impact on the City of Toronto's local roads, particularly Brown's Line, will present a serious issue which has negative impacts for both City of Mississauga and City of Toronto residents. How many trucks will access the site? What is the route which will be taken to get to the site? How will you access the site from Lakeshore?	Please see Chapters 6 and 7 of the EA for detailed information with respect to site access routes and the effects of truck traffic on local roads.
	Accessing the site through the Arsenal Lands would have implications on two major apartment buildings on Lakeshore.	Comment noted.
	Do you need to get TRCA Authority Approval to go through the Arsenal Lands? Are there affiliations with the Authority and the City of Toronto?	Yes, we will need to obtain approval from TRCA's Authority to access the site through the Arsenal Lands.
	Is access through the WWTF being considered as an option?	Yes, the WWTF was considered closely as a potential access site. Please see Chapter 6 of the EA.
	Will the access route through the Arsenal Lands cross the Waterfront Trail?	Yes, a route through the Arsenal lands could cross the Waterfront Trail. Please see Chapter 6 of the EA for the evaluation of access routes.
	Recognizing the significant amount of infrastructure and works along Lakeshore, the logical route for trucks to access the site would be Brown's Line. How can you ensure that trucks take the identified route?	There are measures which can be taken to encourage trucks delivering fill to the site from other projects, as part of the site authorization processes for accepting fill. If the trucks did not utilize the identified routes, they could be denied access to the site. Though, since the LWC Project is not in direct control of those other Project Contracts (where fill is being generated), there is limitations on how much direct control the Project is able to exert.
	There is an issue with the sound of trucks backing up. The beeping sound carries across the water quite a distance. Residents who live on the south side of Lake Promenade will be subjected to that noise for the duration of the project's construction. Can anything be done about the noise?	Noted. We will need to confirm the safety standards and regulations for these types of constructions sites. We will also explore options for what can be done on site to minimize the sound. On certain sites, a directional sound is utilized to minimize the distance the noise travels; while on other projects, the trucks have the ability to deposit the material without backing up. These options are site and contractor dependent, but will explore options during detailed design.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Construction	Accessing the shoreline through the Arsenal Lands will maximize, not minimizing nuisance effects on the surrounding neighbourhood and on Marie Curtis Park. Consider accessing the site through the OPG lands.	We acknowledge that the access route is not ideal. However, this is the best of the worst access alternatives we assessed. At this time, access through the OPG lands is not possible but it might be possible in the future.
	Consider allocating specific truck routes to minimize nuisances associated with truck traffic.	At this juncture we know that trucks will be coming from the QEW and/or from the 427. Because the truck contracts are not in our control, we may not be able to determine the routing of the truck traffic. Access to Lakeshore Road will likely be from Brown's Line, Dixie Road and Cawthra Road.
	250 trucks per day is a key issue and will generate nuisances such as noise, dust and contribute to traffic congestion.	Please see Chapter 7 of the EA.
	How soon will the LWC Park construction begin? Will there be overlap with the Etobicoke Creek bridge construction?	The earliest the LWC Park construction will begin is late 2014; therefore there will not be overlap.
	Why not store the fill closer to the LWC Park in order to minimize disruption due to truck traffic?	The only available space in proximity to the LWC Park is the overflow parking lot at the G.E. Booth plant, which has limited storage capacity, and the Peel's Britannia Road property. The Britannia Road location makes sense because it is located in close proximity to the northern portion of the Hanlan feedermain construction. Once a landbase is established in the area of the first containment cell for Lakeview, stockpiling will occur there.
	Consider the possibility of there not being sufficient fill to finish construction on time. Also consider that construction may be delayed due to politics and the impacts on the surrounding community.	In addition to the Hanlan Feedermain and other Peel projects, we will also be accepting fill from other projects throughout the GTA. There is a lot of fill available in the GTA and we do not anticipate there being insufficient volume. Furthermore, it is not in our interest to extend the duration of construction. The longer the construction process, the higher the cost.
	Consider opening completed components of the LWC Park during construction.	We may be considering (as part of the detailed design component of the LWC Project) a phased restoration. There are a number of options that we can consider to ensure that as construction unfolds the completed elements of the LWC Park are not affected. Site stabilization will occur as the LWC Project progresses.
	Consider other access routes to minimize impact.	Chapter 6 outlines the routes considered and the evaluation and selection process undertaken.
	How long will the trucks be active in this area during construction?	The tentative construction period will be 7 to 10 years. We understand the construction will have implications on the surrounding neighbourhood. We are exploring and doing everything we can to minimize impacts and to add some value/benefits during the construction phase.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Construction	All five project Alternatives are directly adjacent to the OPG land and the City of Toronto. Consider consulting both organizations about the proposal.	We have been in discussions with both the City of Toronto and OPG through the EA process. The City of Toronto is generally supportive of the Preferred Alternative and OPG is also generally supportive of the LWC Project.
	Are City of Toronto staff and Councillors aware of this project?	The LWC Project Team has maintained an open line of communication with City of Toronto staff and Councillors throughout the Feasibility Study, Terms of Reference phase, and EA phase of the LWC Project. City of Toronto technical staff participate in the LWC Technical Advisory Committee, providing input and direction into the Project; while Councillor Grimes was invited to attend the CLC and continues to receive project updates and notices.
	Is there a way of letting the Toronto public know what is going on?	In response to your suggestion, the Project team has installed temporary signs at Marie Curtis Park to advertise the Summer Community Engagement efforts. All project consultation events have been advertised in local Toronto newspapers to date and will continue to be.
	Is there someone who needs to give approval for a City of Toronto beach to be disturbed, re-modeled, reconstructed -or whatever the chosen term is. I understand the sand will be left -but if the water is not there it will just grow up with weeds and shrubs in a matter of years. If so-I would like to have that person or committee's contact info.	City of Toronto staff are members of the Technical Advisory Committee who review project information and provide comments. TRCA owns the park, Toronto Park maintains the park.
	How many people from Toronto are on the CLC and is there someone that can be contacted? Thanks again for the efforts that you are making reaching out to the public.	During the formulation of the CLC representatives from Toronto were not identified, however, some of the groups represented on the CLC may include members who reside in the City of Toronto. CLC members have not provided permission to be contacted by community members.
	What exactly does review mean? We can look at it?	The Draft EA will be available for the public and government agencies to read and provide comments on the information presented and the decisions made as part of the EA process undertaken to date. Any member of the public can raise comments which the LWC Project team will address in the context of all other comments received.
	Please advise me where I can access **complete** information as to plans, impact, meetings, etc.	All accurate LWC Project information is available on the LWC Project website at: www.creditvalleyca.ca/lwc , including the approved Terms of Reference, which lays out how the EA will be undertaken; all information presented to the public to date; and links to background studies.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Construction	Consider making the EA document available at multiple locations, including the Lakeview, Port Credit and South Etobicoke library branches.	The EA document will be available in library locations in Mississauga and Toronto. The EA document will also be available for download on the Credit Valley Conservation website.
	Have the MOE, MNR, CVC and Region of Peel all had an opportunity to review the proposed construction phasing, including the access route?	Yes.
	How does the LWC Project coordinate with the Marie Curtis Park Master Plan and the Arsenal Lands Master Plan?	The ability of the LWC project to coordinate with the Marie Curtis Park Master Plan and the Arsenal Lands Master Plan was assessed throughout the evaluation of alternative project configurations and for the detailed assessment of the preferred alternative. Please see Chapters 5 and 7 of the EA.
	Consider future connections to the east of the Project Study Area.	Comment noted
	Should parks not be considered as infrastructure? If not, what do you consider to be infrastructure? The project should ensure compatibility with activities at Marie Curtis Park.	The term infrastructure refers to hard infrastructure, which, for the purposes of this EA, are the GE Booth WWTF and the two water filtration plants. The coordination objective considers consistency with the Marie Curtis Park Master Plan and the Arsenal Lands Master Plan, as well as the Inspiration Lakeview vision for the OPG lands.
	It would be nice to see a coordinated presentation with Marie Curtis Park and the Arsenal Lands so the public is not viewing the information in isolation, but instead can understand the whole concept for the waterfront.	Planning for Arsenal Lands Master Plan has not started and Marie Curtis Park is in its implementation stage. In future planning meetings for both the Arsenal Lands and Inspiration Lakeview, we can make information on the LWC Project available.
Cost & Funding	Differences in construction costs between the five Alternatives.	Please see Chapter 5 of the EA.
	What is the total cost of the project? Who is paying for this project?	The project is being funded by the Region of Peel. Please see Chapter 7 of the EA for preliminary cost estimates.
	Is the cost of the project reduced by the cost savings incurred by reusing the fill instead of disposal at a clean fill site? That is to say, are these savings re-directed towards the cost of the Project? Will these cost savings and total approximate cost of the project be quantified as part of the LWC EA?	The sustainable reuse of the fill locally will help offset transportation costs and allow for investment in the LWC Project. Please see Chapter 7 of the EA.
	Will the LWC Project have a negative cost?	We are working as close as possible to being cost neutral; however, it is likely that there will be a premium (i.e., positive cost). Please see Chapter 7 of the EA.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Detailed Design	Consider incorporating parking, restaurant, and washroom facilities.	Parking will not be established on the created park lands. Parking will be located at the existing parks, and likely the future Inspiration Lakeview lands. Other park amenities will be defined following the EA approvals as part of the detailed design phase.
	Without good lighting and some human activities you could have a great nature habitat but a black hole that would discourage pedestrian and cycling traffic which is the basic intent of the "connect" project.	Noted.
Ecology	Consider introducing only native (Carolinian) species in the LWC Park.	Species will be addressed in the detailed design stage. There will be a variety of native species introduced, likely primarily Carolinian species.
	Consider mosquito proliferation due to proposed wetlands.	The proliferation of mosquito-borne disease, such as West Nile Virus, is a consideration of the project. In general, the primary vector species of mosquito associated with West Nile Virus transmission is *Culex pipiens*. Four other species are also associated with West Nile Virus in the GTA. The larvae of these species of mosquito are known to use stagnant waters that do not provide fish or wildlife habitat. The wetlands being proposed will be designed to provide extensive habitats for fish and wildlife.
	Plant milkweeds for butterflies	Noted.
	How does this project allow for managing invasive species?	Invasive species will be managed through the adaptive management framework which will be outlined in the EA. Please see Chapter 6 of the EA for a discussion of how the design will deter invasive species and Chapter 8 for a discussion of the Adaptive Management framework.
	Are there plans to remove the bamboo in the forest behind the old parking lot?	During the construction of the Stone Overlook in Marie Curtis Park East, the Japanese Knotweed in the area of the east parking lot was initially cut back and has since grown back. Parks and TRCA are currently evaluating options to address this issue.
	Will the proposed islands become nesting habitat for cormorants?	The islands have been designed to be approximately 1.5 m above average lake water levels. This means that during large storm events waves will top over the islands and will inhibit soil from establishing and in turn any vegetation. Therefore, we are creating unsuitable conditions on the islands for cormorant nesting.
	How will they remove the fish, once the retaining wall berms have been built? And to where will they relocate them?	Fish will be removed using a variety of live capture techniques as required such as electrofishing and netting. Captured fish will be released back to the open lake.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Evaluation of Alternatives	Consider using numeric scoring as part of the evaluation of Alternatives.	Please see Chapter 5 of the EA for the evaluation of Alternatives.
	Consider an indicator to measure fiscal viability of each Alternative.	Fiscal viability has been considered throughout the process appropriate for the level of detail of each stage of the EA. The more refined, the more detailed the analysis will be generated. Please see Chapters 5 and 7 of the EA.
	Consider criteria to measure the infrastructure required to support transportation requirements.	The Project will be providing trail linkages through the park. The Primary trail will be established according to City of Mississauga trail guidelines to allow a variety of trail users and emergency vehicle access. Secondary Trails will be established according to CVC conservation trail guidelines. No other transportation infrastructure is to be provided for this Project.
	Consider criteria to measure active recreation opportunities.	The Project is not currently considering the incorporation of active recreation opportunities.
	Consider criteria to measure interpretive activity opportunities.	Interpretation opportunities are available in all Alternatives and will be incorporated during detailed design of the preferred, following EA approvals.
	Consider criteria to measure the extent to which Alternatives might prevent odours from reaching the park.	All Alternatives provide similar characteristics as it relates to separation between park users and the WWTF. Trail alignments and the placement of "natural" habitat features are consistent between options. As such, would not be defining criteria in the selection of a preferred.
	Consider criteria to measure the extent to which the Alternatives attract undesirable species (e.g. cormorants) that may degrade aesthetics.	Alternatives have been developed, in part, from a structural and ecological perspective. Islands were refined at this early stage to ensure that they were not "attractants" for undesirable species such as cormorants. During the detailed design of the Preferred Alternative, additional considerations may be made in the design to address other undesirable and invasive species, such as carp, and Canada Geese.
	Consider criteria to measure 'universal accessibility'.	All Alternatives will have a primary trail which will meet the City's trail development guidelines. These include accessibility requirements.
	Island Beach B and Island Beach C Alternatives are generally preferred.	Noted.
	The Revetment Alternative does not seem reasonable given the project objectives.	Noted.
	Provide the cost of constructing and maintaining the LWC Park for each Alternative being considered.	The Alternatives were not been refined to a sufficient level to develop detailed costs for construction and maintenance. In addition, it is difficult to assess the costs in absence of the funding mechanisms. Relative cost comparisons were made based on the proportion of "purchased materials" that are required. Please see Chapter 5 of the EA.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Evaluation of Alternatives	Were the criteria used to evaluate the Alternatives weighted?	No. All criteria were treated equally.
	The evaluation process and methodology is understandable and adequate.	Noted.
	Why did the Island Beach C Alternative outperform the Island Beach B Alternative in terms of access? The Island Beach B Alternative has a long peninsula that allows privacy and access to the water.	The evaluation was based on the criteria that was put forward and reviewed during CLC #1. With respect to access, we considered the following criteria: (i) potential for lookout areas; (ii) potential for public access to water's edge; and (iii) potential for effects from construction on traditional lands used by First Nations. We also considered the initial objective for access which was to create safe and accessible public linkages for access to and along the waterfront while allowing for compatible recreational, educational and cultural heritage opportunities. When taking all of these criteria into consideration, we determined that Island Beach C Alternative performed slightly better than Island Beach B Alternative.
	Will there be an opportunity to re-evaluate the Alternatives if during the refinement stage we learn new information?	In the detailed assessment phase we evaluated the Preferred Alternative. Once a Preferred Alternative is confirmed, we will not be going back to re-evaluate the Alternatives.
	Consider giving more emphasis to the preservation of existing beaches.	The evaluation criteria have not been "weighted" in the selection of the Preferred Alternative. This was a decision made early in the LWC EA process.
	How did you choose between alternatives which have both positive and negative effects, when you're criteria is only considering the positive effects? It automatically skews the outcome of the analysis.	Most of the negative effects will occur during construction. As previously discussed, it is assumed that construction will be the same for all alternatives. That is to say, the negative effects will be the same for all alternatives. In addition, as part of the detailed assessment of the Preferred Alternative, the benefits, potential effects, and mitigation measures are discussed. Please see Chapters 5 and 7 of the EA.
	Based on the evaluation criteria presented, the loss of sand beach was not considered. I don't believe that there would be consensus among residents regarding the selection of the Preferred Alternative. Personally, I would prefer the revetment along the eastern extent of the landform if it meant the existing sand beach was retained.	Your comment is noted. Throughout the ToR and EA phases of the LWC Project, there have been a significant number of comments submitted. The LWC Project must look at the bigger picture. The trade-offs must be considered within this context.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Flooding	Ensure that the proposed LWC Project does not increase the occurrence of flooding up-stream in Serson Creek.	The City of Mississauga will be replacing numerous culverts in the area allowing the creek to flow more freely. The LWC Project will not result in an increase to Serson's water flows. Rather, we believe that there should be a reduction in flood levels up-stream.
	Consider flooding concerns associated with the Alternatives.	CVC is the floodplain regulator for the LWC project area, and Region of Peel has critical infrastructure in the area. In addition, TRCA is the floodplain regulator for Etobicoke Creek, with low-lying residential properties a relatively short distance to the east of the LWC Project area. All three agencies have critical roles and/or interests in ensuring that none of the options will increase the risk of flooding throughout the area.
	Will the Lakeview Project improve flood protection that was experienced throughout the Region, tied in with the new infrastructure works underway?	The LWC Project is not tied directly to the flood mitigation/avoidance work being undertaken as a result of this summer's stormy weather.
Marie Curtis Park	Why was this not done in conjunction with the recent Marie Curtis Park improvements?	The LWC project planning has been done keeping in mind the recent Marie Curtis Park improvements. Both projects could not be considered together as they have different and non-complementary approval requirements and different proponents.
	Does this project affect Toronto's Marie Curtis Park west master plan? I haven't heard of any changes to the west side. Planned improvements have not taken place other than removing parking lot. Is observation hill still being built?	The LWC project will not affect the ultimate build out of the Marie Curtis Park master plan.
Materials	For the Island Beach A, Island Beach B, and Island Beach C Alternatives, will the fill to create the islands all come from the Hanlan project or will some of it have to be "purchased"?	Islands are almost entirely created from purchased material.
	Consider a contingency plan in the event there isn't sufficient fill generated so that the configuration/land mass of the park can be adapted.	Flexibility has been built into the LWC EA Adaptive Management Plan to accommodate change, including possible reductions in fill for the Preferred Alternative.
	Consider looking outside of the Region of Peel for fill.	We will be looking beyond the Region of Peel to ensure there is sufficient fill volume to construct the LWC Project in a timely manner.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Materials	Consider separating the fill into piles based on quality to ensure that low-quality fill is not mixed with high-quality fill.	The LWC Project will incorporate Best Management Practices in a Fill Management Plan to control fill quality. Every source of fill will undergo compliance testing before authorization to receive materials is provided. Visual inspections of every load will be undertaken with random samples being taken for additional quality compliance monitoring.
	Are you still stockpiling fill in the Arsenal Lands?	Fill is not being stockpiled at Arsenal Lands. There may be temporary stockpiles of construction rubble on site in 2014-15.
	Does any of this fill contain rebar? Concern that the new beach front will have protruding rebar, similar to Leslie Street Spit and Colonel Sam Smith Park, rendering the shoreline entirely inaccessible.	While the fill material being generated through the Region of Peel capital projects is clean, native soil and rock; there is potential for the LWC Project to use construction rubble in the creation of a containment berm (behind which fill is placed). The MOE considers rebar an inert substance (e.g., it does not break down over time) and is an approved material for use in these types of projects. Although current industry standards state that rebar must be cut down to the concrete, it will become exposed over time. TRCA has learned from past projects, and are very selective in how material containing rebar is used. Any possible rebar will be buried under metres of fill, such that it will not be exposed over time. The beach face will also be dressed with cobble / revetment.
	Are there any ISO standards for the use of material in land creation activities?	The LWC Project will meet the Ministry of Environment's standards for Confined Fill Material Criteria (*Fill Quality Guide and Good Management Practices for Shore Infilling in Ontario, 2011).*
	The aesthetic and human use component is important in terms of getting the fill right. The current fill at Marie Curtis and Sam Smith is so ugly, unnatural, and even dangerous. It also dissuades use because of the awkward angles and spaces between the rocks.	Comment noted.
	Where is the material coming from?	This project is based on an opportunity to take advantage of clean fill being generated by the Region of Peel's infrastructure expansion plans over the next ten years. RoP estimates up to 1.5 to 2M cubic metres will be generated by their works. Standard practice currently treats this clean material (glacial tills and bedrock) as a waste, shipping this material long distances to be dumped in pits in small communities. This has significant costs and impacts on Regional and rural transportation areas.
	Cobble is difficult to walk on and to put down a chair to sit. Look at opportunities to make the cobble as small as possible.	Comment noted

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Materials	What will the size of the cobble stones be?	There will be two different sizes of cobbles. The three cells on the south-west side will contain cobbles between 4 inches and 8 inches, and the north cell will contain cobbles ranging from 0.5 inches to 4 inches.
[redacted]		
Miscellaneous	Will the new land creation area collect debris? Will it impact debris accumulation along the sand beach of Marie Curtis Park West? Who will clean any debris which accumulates? Can debris be cleaned from the cobble beach of the new land creation area?	Debris will continue to accumulate as it does currently. The benefit of the Preferred Alternative is that it does not create a large armourstone wall on the eastern limits of the project area that would encourage enhanced accumulation of debris on the sand beach areas. As the majority of the sand beach will remain, current beach maintenance activities will continue as are currently undertaken by Toronto Parks. The larger cobble beaches will not be located within the City of Toronto jurisdiction.
	Is there a risk of contaminants entering the project site from OPG's Lakeview site?	Based on the publicly available records of soil and groundwater quality available about the OPG site, our consultants indicate that the risk of contaminants entering the project site from OPG's Lakeview site is low. The former OPG Lakeview site has undergone some remediation activities to address soil and groundwater contamination.
	Is any of the fill from Region of Peel capital projects sent to the Leslie Street Spit?	No.
	Is the increased depth of the lake near the eastern OPG pier due to previous lakefilling activities for the WWTF or past stone hooking activities?	There is a drowned river valley system in this area which results in sections which drop down in depth quite suddenly. The western portion of the land base is close to the existing shoreline for this reason.
	In Etobicoke, the lake is quite shallow for quite a distance into the Lake.	TRCA staff conducted a detailed bathymetric survey of the LWC Project Study Area in 2011. Depths within this area vary up to approximately seven metres along most of the outer edge, although there is a steep drop-off approaching 10-m in the southwestern corner, fronting the edge of OPG's Lakeview site. There is a shelf-like feature fronting the WWTF, so the nearshore bottom slopes are flatter immediately in front of the WWTF than in front of Marie Curtis Park. Depths at the tip of OPG's eastern pier are in the order of seven metres. A bathymetry map of the LWC Project Study area is available in Chapter 3 of the EA.
	Hoping that OPG lands are sold to the region for development under Lakeview inspiration and not an OPG vision.	Comment noted.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Miscellaneous	What would the shoreline have looked like prior to the shoreline stabilization and urbanization?	Likely there would have been some sand and gravel as part of the barrier beach, and as you moved west, air photos suggests that the shoreline would have been about 4-5 m high and quite vertical, consisting of glacial tills, with a narrow cobbly - gravel beach as we move west away from the influence of Etobicoke, Serson and Applewood Creeks. Similar conditions can be found along the Oshawa waterfront near Gold Point Marsh. Natural meadows and coastal forest with a coastal wetland system is found in that area as well.
	What is the current construction of the shoreline near the water treatment plant?	It is mainly comprised of armour stone rocks with a steep grade. The shoreline at this location is characterized by poor habitat conditions.
	Is there space within the Lakeview Waterfront Connection Project for managed honeybee cultivation? We would require minimal space (30 meters square) and would provide all necessary equipment for the maintenance of 2 honeybee hives.	Where native biodiversity is an objective, honeybee cultivation is not permissible on conservation lands. We instead prefer to encourage native pollinators to these areas.
	Consider that new ideas may arise in the future that can inform future park design options.	Chapter 9 of the EA is the amendment chapter which states that if new information arises, the EA does not need to be redone, but rather amended. Therefore, we have designed the EA document to have flexibility to change the design of the LWC Project without the need to redo the entire EA.
	Will the land be sold at a later time for high-rise development?	This will absolutely not occur. CVC is identified as being the agency that will own the waterfront park. CVC will manage the area as conservation lands and will protect them as a natural and recreational area in perpetuity.
	Consider that Lake Ontario's water levels may change over time. The proposed designs should be based on future lake levels, which are difficult to predict.	As part of the detailed assessment, we considered the adaptability of the design in light of changing water levels and in light of climate change. We understand that the water levels may change due to regulations and policy changes and that climate change and storm activity will also have implications on the shoreline.
	What is the current flow of water along the shore?	The current flow ranges from approximately 0.01 to 0.03 m/sec and does not change significantly as a result of the preferred alternative.
	Will the sediment accumulate against the groyne and extend into the lake?	This is known as a sediment starved area of the lake shore. These structures can cause localized sand accumulations, but it should not be significant here due to the limited supply of sand available. If issues are observed, an adaptive management strategy can be implemented.
	Who will own and maintain the LWC Park once construction is completed?	CVC would be the owners of the property. CVC would also be responsible for operating and maintaining the property. The intent is for the LWC Park to be a conservation area in perpetuity.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Miscellaneous	What will prevent the wetlands from becoming stinking ponds of algae?	Nutrient loads within the wetlands will be taken up by wetland vegetation. Experience with wetland restoration projects throughout the GTA suggest algae will not be an issue, provided the design maximizes aeration and water circulation in the wetland.
	If the final EA isn't due until next winter and the decision on the OPG lands is expected in June, could not both options for trucking be included in the draft and finalized in the final report?	The June decision will lay out the long term plans for the use of the OPG lands. It is likely that after that decision additional studies may be required and no decision has been made on the timing of construction. The LWC project needs to proceed at the present time to take advantage of available fill therefore, it is not possible to include both options in the LWC EA.
Modeling, Studies, and Analyses	Ensure that the water circulation modelling is based on current conditions and the proposed Alternatives.	The modelling was completed based on current conditions and each of the five footprints for the Alternatives evaluated. Please see Chapter 5 of the EA.
	Consider water currents associated with the Island Beach A, Island Beach B, and Island Beach C Alternatives.	In discussions with the coastal engineer, the proposed island Alternatives (Island Beach A, Island Beach B, Island Beach C) are not conducive to producing rip-current conditions. Dangerous currents are typically associated with wide, shallow sandy beach conditions. These conditions will not be formed by the cobble beaches that will be located in deeper waters.
	Consider conducting a wave study.	All of the proposed designs are based on coastal engineering studies.
	Consider the accumulation of organic materials along the shoreline.	According to the coastal analysis conducted, there will be no change in coastal circulation.
	What lake level are the studies predicated on?	Different lake levels are considered for different variables. Base lake levels for flood modeling of the local creeks are higher than the assumed lake levels for coastal dynamic and circulation modeling. In addition, the wetland design considers the extremes in water levels to account for potential changes in lake level due to climate change.
	Have the water circulation models been back-tested? Back-testing is a critical aspect of building any model.	The water circulation and water quality model was calibrated with 2004 MOE ADCP data.
	Consider doing a historical study of what the landscape of this site looked like before the design began	As part of the LWC Project EA, we assessed historical photography and we discovered that there used to be a coastal wetland in this area that connected Etobicoke Creek, Applewood Creek and Serson Creek. We used this information to inform the design of the LWC Project and in particular, to confirm the wetlands wanted to be there.
	How will the water flows be affected by the groyne and the proposed design?	Based on the modeling results, there would be very little change in circulation between present conditions and future conditions.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Parking	Will there be new parking associated with the project?	No there will be no new parking associated with the LWC project.
	There isn't enough parking now. What happens in the future?	We are working with the City of Mississauga to look at parking as part of the overall Inspiration Lakeview Project planning and development for the former OPG lakeview site. Similarly, TRCA does own the Arsenal Lands. The Master Plan update and implementation will occur in the future in partnership with the City of Mississauga. As part of that process, we will explore opportunities for adding parking into the design of the Arsenal Lands Park.
Presentation of LWC Project Information	Consider adopting a two column format in order to improve notice readability.	Noted.
	Consider providing studies completed as part of the EA to CLC members for review.	Background technical reports will be included in the Appendices of the EA document itself. Much of the baseline data used in the LWC Project EA will be posted on the Lake Ontario Shoreline Strategy (LOISS) website ahead the EA submission and interested parties are welcome to access studies there.
	Include 3D visuals to get a better sense of what is being proposed.	3D renderings of Island Beach C Alternative will be prepared for the final EA document for visualization purposes.
	Provide the drawings of the five proposed Alternatives to the CLC for review.	The presentation to the CLC (which included drawings of each Alternative) was provided with the CLC meeting minutes.
	Beach users are unaware of this project. I think it is very important that you inform the beach-using community – ideally with a kiosk in the parking lot on summer weekends.	As a result of this recommendation, the Project Team prepared information that was presented directly to park users at Marie Curtis Park for feedback over a number of weekends throughout the summer.
	There should also be a display at Marie Curtis Park West.	Noted.
	Concern regarding being unaware of previous consultation activities	Noted.
	There should be more information on the Mississauga side.	Noted.
	Publicize the project to the City of Toronto and put project information on the City of Toronto website.	Noted.
	Put more signage on the West side of Marie Curtis Park.	Noted.
	Show an overlay of the existing vs. the proposed shorelines.	Noted.
	Put more signs up.	Noted.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Presentation of LWC Project Information	Start the public meetings at 7:00 PM as people can't make it from work if it starts any earlier. Concern regarding public meeting accessibility.	Noted.
	Will the next public meeting be accessible by TTC? From what I saw of the proposed project is that the only public lands that are impacted by the project are Toronto lands-namely Marie Curtis west beach-and I think it only fair that the next E.A. meeting should be in Toronto.	The LWC project affects public lands both in the City of Mississauga and Toronto. In addition, the Project will provide extensive benefits for residents living in both cities as well. The importance of public transit access is understood. The project team is looking at venues for the final PIC that will be accessible by transit and closer to the project site.
	Show the municipal boundaries on the imagery.	Noted.
	Great to see the municipal boundary depicted on a map of the Project Study Area. Very clear.	Comment noted.
	There should be winter renderings.	Comment noted.
	The description of beaches is not correct. I understood rocks would be flat, rather than round.	Beach material sizing had only been explored to date. Round material has typically been used on created beaches in the Greater Toronto Area. Recent discussions with the Coastal Engineer, following questions raised by the public, has indicated that flat materials are not likely viable for the Lakeview Project.
	Show all things going on with connecting projects.	Comment noted.
Recreation	Ensure the proposed islands will not preclude the use of non-motorized vessels (canoe, kayak, etc.) due to high waves and strong under toe.	The open coast areas of Lake Ontario are prone for rapid changes in wind and wave and currents. It is unlikely that the proponents would encourage the use of small, non-motorized watercraft along the waterfront.
	Consider limiting the use of motor-powered vessels in the proposed wetland areas.	There is no intention to allow motorized vehicles into the wetland areas.
	Concern regarding navigation hazards introduced by the islands.	As part of the EA process, we will need to apply for appropriate permits from Transport Canada with respect to navigation. Transport Canada does not process permit applications of this nature until the EA has been completed. Through the permit system we will be providing detailed bathymetry information that can be uploaded onto GIS layers to ensure safety. Navigation markers will likely be required.
	Consider the safety of trail users in the design.	Noted.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Recreation	Consider public safety if allowing boat access into the embayment area.	Public safety has been considered and none of the Alternatives encourage shoreline boat access. Boating will be conducted at the operators own risk.
	Consider the public experience, including recreational opportunities in the park.	Noted.
	Consider allowing swimming in the embayment area.	Swimming will likely not be encouraged due to water conditions and will be undertaken at the participant's personal risk.
	Provide more details on public recreation opportunities. The public experience is also an important consideration in addition to the environment and ecological habitat.	More details on passive public recreation opportunities will be built into the detailed design stage. Specific parks programming will not occur until the detailed design of the Park following EA approvals. It is critical during the EA stage that the land base be provided such that opportunities for passive public recreation components can be accommodated in the design at later stages. A list of "suitable" passive recreational infrastructure (trails and lookouts) can be produced as part of the EA, with a map indicating approximate locations where these could be located.
	Consider the human element in the park in addition to naturalization.	The recreational amenities of the park as well as the final location of the multi-use trail and secondary trail system will be determined during detailed design after EA approval has been received. These types of details are not typically defined within an EA.
	Need to consider the impacts on windsurfing and kite-boarding.	Noted. Please see Chapter 7 of the EA.
	The islands are a problem for windsurfers.	Noted. Please see Chapter 7 of the EA.
	I pull my kayak up on the remnant beach and won't be able to do this with a cobble beach.	Noted.
	I can't walk into the water from the sand behind the cobble.	Noted.
	Will the settling ponds be accessible to birders?	No, the WWTF is not accessible to the public
	Will skating on the wetland be permitted in Winter?	Skating in an area which CVC has not designated for such an activity would be a prohibited use. Signage will indicate that skating is prohibited.
	Will there be a bike path?	Yes, the Waterfront Trail will be relocated from Lakeshore Road to the water's edge.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Support for LWC Project and / or Process	The new LWC Project Study Area is reasonable.	Noted.
	Happy to know that the studies are taking into consideration changing Lake Ontario water levels.	Noted. We will be building in additional variability and capacity within the final design for the wetlands and creeks in the event that long-term water levels in Lake Ontario changes, or if storms get bigger in the future.
	The five Alternatives presented are reasonable and make sense with the exception of introducing revetments.	Noted.
	The evaluation approach seems reasonable and appropriate.	Noted.
	The Alternatives reflect the CLC's and the public's input.	Noted.
	Pleased with the consultation process.	Noted.
	Evaluation approach is reasonable. It is a good an exciting process.	Noted.
	The evaluation objectives being used are good.	Noted.
	I am highly impressed with the quality of communications, on all levels, associated with the project.	Noted.
	Your response affirms my sense that the Mississauga Waterfront Connection EA Project and all other initiatives related to the redevelopment of the Lakeview Area demonstrates an exemplary communications strategy and a strong focus on ensuring that meaningful input from residents is an integral part of the planning process.	Noted.
	This is a great project – anything that helps animals is good.	Noted.
	The new beach configuration is good.	Noted.
	I am on-board with the project.	Noted.
	Nice to see something being done with the shoreline in this area.	Noted.
	Happy to see a naturalized park that will provide benefits for migratory birds.	Noted.
	Let's do it! Nice project.	Noted.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Support for LWC Project and / or Process	It is recognized that parks of this nature require time to complete. While it's an inconvenience, it's also a great benefit. We would like to see something move forward.	If there are continued objections regarding one project element after another, this may stop the project entirely. That's not what the community would like to see happen.
	Fundamentally, extending the waterfront for connections is good.	Comment noted.
	Love the Project.	Comment noted.
	It will be nice.	Comment noted.
	Great Project.	Comment noted.
	Great to See.	Comment noted.
	We need more wetlands!	Comment noted.
	Need more natural areas like this project!	Comment noted.
	We are pleased with the project.	Comment noted.
	Preferred Alternative Island C is good! Hurry up! Make it happen in 5 years.	Comment noted.
	Get the shovels in the ground and get it done. Going to be great.	Comment noted.
	The refinements are an improvement over original plan. Overall, this will be a great.	Comment noted.
	Impressed with proposal.	Comment noted.
	A substantial improvement over the original…no need to destroy a sand beach!	Comment noted.
	Much happier, there is still room to improve. We need to save more of the naturally occurring beach. Thank you!	Comment noted.
	I am very excited at the naturalization initiatives and their positive effects on insects, birds, fish and native plants and habitats. I support taking some beach area from Marie Curtis to implement naturalization.	Comment noted.
	The LWC Project is great, the plan is excellent, well-thought out, considerate of competing interests and true to the goal and objectives. I'm looking forward to exploring the park as it is developed!	Comment noted.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Support for LWC Project and / or Process	The Lakeview Park is a great idea and I support the initiative. Developing a man-made park which does not restore the natural features of the area works against natural forces; and will, as CVC confirms, require intervention in perpetuity. This cost should be in the proposal.	Comment noted.
	I like the option of the smaller footprint on the west beach at Marie Curtis.	Comment Noted.
	The design of the wetlands seems much improved over the sweeping floodplain presented previously.	Comment Noted.
Timeline	When will the construction for the Arsenal Lands begin?	Construction of the Arsenal lands will be delayed pending completion of the LWC Project. During detailed design it will be determined if there are aspects of the Arsenal lands that can be constructed while the LWC Project is under construction.
	Timeframe is ok.	Noted.
	What are the timelines for the implementation of Inspiration Lakeview plan? 10 to 30 years?	It will depend on the decision that is made by June 2014 regarding the future of the OPG lands.
	Do the project timelines consider the use of 2 million m^3 of fill? If it takes 20 years to generate this fill, there is concern that the project may continue indefinitely.	It is not the Region of Peel's intention for the Project to continue beyond the 10 year timeframe. Although the Project is dependent upon fill generation by the Region's capital works projects, should there be downtime, the Project is in discussions to consider fill from other municipalities and private sources. There is significant development downtown Mississauga, as well as significant development in the City of Toronto with MetroLinx works and revitalization areas. Fill quality monitoring will be conducted on every site sending material to the LWC Project to ensure the fill meets the MOE's guidelines.
	Is there any way to have legal assurances that the project will not continue beyond 10 years? Given that the Project is working towards being cost neutral, there is no incentive to not wait for the Region to generate the fill, even if it takes 20 years.	The purpose of the Project is not to dispose of the Region's fill material. The fill generation by the Region of Peel simply provides an opportunity to create the Project. It is in the best interests of the Project to complete construction as soon as possible as downtime, and the costs associated with construction and equipment time are very expensive.
	This project will take too long to build – get it done sooner.	Comment noted.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Trails	Provide more detail with respect to trail size.	The main trail size will be at least 3m in width (standard to allow emergency vehicle access) and will meet City of Mississauga trail guidelines. The size of secondary trails will be determined in the detailed design stage of the process.
	Ensure that the trails in the proposed park accommodate multiple users.	It is our intention to ensure that the trail system within the park will be able to accommodate multiple users including cyclists and pedestrians, as well as maintenance and emergency vehicles on the primary trail.
	Is it possible to create a trail in front of the WWTF without lake-filling?	No there is not sufficient space to create a multi-use trail in front of the WWTF without lake-filling.
	The trail doesn't go anywhere without the use of OPG lands.	Comment noted.
	I would like to ask you, when you get to the detailed planning stage of this project, to ensure that the trail be designed to have AMPLE SEPARATION between the walking lane area and the lane designated for bicycles, rollerblading ,skateboarding, etc. as opposed to just a painted line.	Noted. Issues pertaining to separation on trails will be considered during the detailed design stage of the EA.
	Ensure that the trail is multi-use	Noted.
	Reroute the waterfront trail along the shoreline south of the water treatment plant plus the OPG so as to connect the trail on Lake Promenade (Etobicoke) with the trail on Lake Promenade (Mississauga) before significant landfill starts to extend parkland south of the plants	Noted.
	The trail should not go along the waterfront, it should go through the Waste Water Treatment Facility north boundary.	Comment noted.
	The proposed Waterfront Connection Project will result in the closure of the bike path (Waterfront trail) through the Arsenal Lands for 7 to 10 years. I object to this closure.	The LWC Project Team has identified the existing Waterfront Trail as the preferred location for the construction access route following an evaluation of several route alternatives against criteria representing the full definition of the environment. To mitigate for the closure of the trail, the Waterfront Trail will be re-located for the duration of construction and the construction access will be opened to walkers and cyclists in the evenings and on weekends. The LWC Project Team will continue to work to further minimize these effects during detailed design. Please see Chapters 6 and 7 of the EA.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Trails	This landfill site is to be wildlife habitat. I am concerned that there may be too many secondary trails. A trail that snakes up, across, then down the large hill will have tertiary trails leading straight down to the main trail. Too often, people want the shortest distance. Meandering trails are nice (normally preferred) but they take up more land, leaving less for nature.	Trail design will occur at detailed design and will consider these and other issues.
Views	Consider opportunities to maximize views into the water and into the land.	Viewscape analysis was built into the development of Alternatives. The evaluation of Alternatives will consider viewscapes from specific look-out areas.
	How high will the revetment be and will it obstruct views?	The revetment is approximately 4 metres above the average lake level (+/- 15 feet). The height of the revetment will be similar in height to the pier. The revetment must be this high due to the wave energy in this area.
	Consider not obstructing any critical views.	We are aware of the interest in viewscapes.
	In general there are no objections to the Preferred Alternative Island C, but consider views carefully.	Noted.
	With the presence of the large promontories in the west and near the WWTF, what happens to the views to the City of Toronto?	Viewscapes have been an important driver of the project from day one. The largest hill adjacent to the WWTF was placed there to block views from the park to the WWTF. When standing on the hill itself, views will continue to be blocked to the WWTF by the proposed forest community located on the hill, once it matures. The more southwesterly hill was located in such a way that views to the City of Toronto skyline can be retained both from the end of the OPG piers and through the saddle between the two hills from the base of the pier at OPG. There will be some angles that the skyline will be hidden by the terrain, but there are many located where the views will be spectacular.
	Consider how to manage plant growth so as to not obstruct views.	There will be ongoing maintenance occurring in the LWC Park. In addition, as part of the design, the meadow areas will have harsher environmental and soil conditions which will retard (though not entirely inhibit) tree growth. The combination of vegetation management and park design will be used.

Table 10.9 Summary of Comments and Responses (Cont'd)

Issue	Comments and Questions Received	Responses
Waste Water Treatment Facility	How realistic will beach area utilization be because of the odours from the wastewater treatment plant?	Woodbine Beach in Toronto is one other largest draws to the Toronto waterfront, despite being immediately downwind from Toronto's Ashbridge's Bay Treatment Plant. It is anticipated that the LWC Project will be a major public attraction for the Region.
	Consider overflow from the wastewater treatment plant into the proposed naturalized area.	There are no overflows to be accommodated in the LWC Project design associated with the G.E. Booth WWTF. All flows are discharged through their existing overflow pipes.
	Concern over unsightly WWTP and the odour that is emitted.	New trees proposed in the LWC plans will partially obscure WWTP.
	If there is one thing the City of Mississauga does not enjoy, it is the aroma from the WWTF. This Project will move the aroma east into the City of Toronto.	The Region of Peel has invested in substantial upgrades to the WWTF, greatly improving the conditions. The LWC Project will not change the movement of odour into the City of Toronto from current conditions.
	Will the project address the smell from the WWTP?	This project will not address the odour from the WWTP. However, plans call for trees to be planted in front of the WWTP, partially obscuring it from view while in the new park.
Water Quality	During storm events, the new landform will stop the pollution discharging from the mouth of Etobicoke Creek from dispersing, impacting water quality at the Marie Curtis Park beaches.	The water circulation and water quality model in use by the Regional Water Quality Monitoring Network, was applied to the north shore of Lake Ontario in the vicinity of the Ontario Power Generation intake channel (OPG) to access the effect of land creation activities on the water quality at the two closest water treatment plant intakes, as well as the Marie Curtis Park east and west beaches. These results indicate that at each of these locations, there was either no significant effect to water quality, or a marginal beneficial increase in quality.
	I am very concerned that the proposed lake fill will increase the number of days the *E. Coli* counts are too high to swim at the existing Marie Curtis East beach, where the city monitors the water daily and has lifeguards.	Water quality and water circulation modeling has been undertaken as part of the LWC EA. The modeling suggests that the project will not have a substantive effect on the swimability of the beaches at Marie Curtis Park The modeling does however, indicate that given the deeper shoreline conditions of the Preferred Alternative, pollution plumes from Etobicoke Creek would disperse more quickly than under existing conditions, resulting in a minor increase in days that the beaches would be deemed swimmable. Given these results, there is overall little to no change in water quality condition over the existing conditions.

10.7 FIRST NATIONS AND MÉTIS CONSULTATION

10.7.1 Objectives

The objectives of First Nations and Métis consultation were to identify and address specific concerns relating to traditional territories, including heritage and archaeological resources, Aboriginal rights such as traditional hunting or fishing grounds, and / or specific treaty rights.

10.7.2 Contact List

The contact list for the First Nations and Métis consultation component of the LWC Project was initially based on a list provided by the Region of Peel. A letter was sent to federal (Aboriginal Affairs and Northern Development Canada) and provincial (Ministry of Aboriginal Affairs) authorities outlining the LWC Project, the LWC Project Study Areas and scope (see ToR Record of Consultation, Appendix E-6) and the final list of First Nations and Métis was compiled with additional information from the various authorities. This list has been updated throughout the LWC Project EA consultation process as contacts and contact information changed.

The following communities were contacted:

- Alderville First Nation;
- Beausoleil First Nation;
- Fort William First Nation;
- Chippewas of Georgina Island;
- Chippewas of Mnjikaning/Chippewas of Rama;
- Credit River Metis Council;
- Curve Lake First Nation;
- Haudenosaunee Confederacy Council;
- Hiawatha First Nation;
- Huron-Wendat First Nation;
- Kawartha Nishnawabe;
- Métis Nation of Ontario;
- Mississaugas of the New Credit First Nation;
- Mississaugas of the Scugog Island;
- Mohawks of the Bay of Quinte;
- Moose Deer Point First Nation;
- Nishnawbe Aski Nation;
- Peel Aboriginal Network;
- Six Nations of the Grand River: Elected Band Council;

- Six Nations of the Grand River: Lands and Resources; and
- Williams Treaty First Nations.

10.7.3 Letters to First Nations and Métis Communities

The LWC Project team consulted with First Nations and Métis communities according to the requirements of the Crown's *Duty to Consult* process. First Nations and Métis communities that have potential or established treaty rights in the vicinity of the LWC Project were contacted throughout the EA and asked if they were interested in the LWC Project and how they wanted to be consulted. A summary of the correspondence sent to First Nations and Métis communities is outlined in Table 10.10.

In all correspondence to First Nations and Métis communities, the LWC Project team extended an open invitation to meet and discuss the LWC Project in greater detail, and provided the address to the LWC Project website.

First Nations and Métis communities were contacted a total of five times throughout the LWC Project EA process. Each letter or email was followed up with at least one phone call to confirm receipt of the notice. All letters were sent via priority mail.

Letters and attachments can be found in Appendix E-7.

Table 10.10 Summary of Correspondence to First Nations and Métis Communities

Notification	Date
Notice of Commencement and PIC #1	Mail: December 28, 2012 Email: January 2, 2013
PIC #2	Mail: March 19, 2013 Email: March 18, 2013
Project Update and Supplementary Newsletter	Mail: August 6, 2013 Email: August 6, 2013
PIC #3	Mail: October 30, 2013 Email: October 30, 2013
Notice of Submission of Draft EA	Mail: December 12, 2013 Email: December 12, 2013
Notice of Submission of Final EA	Mail: May 2, 2014 Email: May 2, 2014

10.7.4 Summary of First Nations and Métis Comments

A letter was received from the Haudenosaunee Development Institute (HDI) on October 9, 2012, near the end of the Ministry of Environment (MOE) review of the LWC EA ToR process. This correspondence referenced an earlier letter submitted during the LWC EA ToR indicating that the LWC Project would impact treaty rights and indicated that the proponents were to submit an application fee to initiate their review of the proposal. The Proponents responded that both of their correspondence had been received and that the Proponents would be pleased to meet with HDI at a time and location at their convenience. Please see Appendix E-7 for a copy of correspondence with HDI.

Responses from First Nations and Métis communities to the NoC and PIC #1 Notice were to inform of contact changes, except for two communities who requested meetings with the LWC Project team: Mississaugas of the New Credit First Nation and Métis Nation of Ontario.

The meeting that took place on January 15, 2013 between the LWC Project team and the Mississauga's of the New Credit First Nation covered some of the ways the MNCFN could contribute to the LWC Project and possibilities for the LWC Project team to further involve the MCNFN. Appendix E-7 provides a copy of the meeting summary and presentation.

The LWC Project Team scheduled a meeting with the Metis Nation of Ontario for March 7, 2013; however, the meeting did not take place due to conflicting schedules. Although attempts were made to reschedule, a meeting did not transpire. Appendix E-7 provides a copy of correspondence between the LWC Project team and Métis Nation of Ontario.

Response to the PIC #2 Notice was limited to the Mississaugas of Scugog Island First Nation, who requested they be kept appraised of LWC Project developments and associated public meetings. The LWC Project team did not receive written responses from communities to the Project Update and Supplementary Newsletter sent on August 6, 2013.

Response to the PIC #3 Notice was limited to Chippewas of Georgina Island, who requested to be kept informed of the Project and to be involved during the process. Beyond this letter, the LWC Project team did not receive responses from other communities to the PIC #3 Notice sent on October 30, 2013.

Table 10.11 Responses from First Nations and Métis Communities

Community	Method of Communication	Date
HDI	Mail	October 9, 2012
Mississaugas of the New Credit First Nation	Meeting	January 15, 2013
Mississaugas of Scugog Island First Nation	Email	April 15, 2013
Chippewas of Georgina Island	Email	November 27, 2013

To date, First Nations and Métis communities have not expressed concern about the LWC Project moving forward as described. Curve Lake First Nation and Mississaugas of the New Credit First Nation expressed particular interest in ancestral remains, and asked that we notify them immediately if findings of this nature occur at any point during the LWC Project. All records of communication can be found in Appendix E-7. Records of communication made with First Nations and Métis communities during the ToR stage can be found in the ToR Record of Consultation.

10.8 AGENCY CONSULTATION

10.8.1 Objectives

Throughout the development of the EA, regulatory bodies and interested agencies at the municipal, provincial, and federal level were invited to participate in a comprehensive agency consultation program. The objectives of the EA agency consultation were to consult with all potentially interested agencies about the EA; and ensure coordination between the LWC Project EA and the broader local and regional planning context.

10.8.2 Contact List

As part of the ToR, a contact list of regulatory and interested agencies was developed, which included identification of all:

- Applicable provincial and federal regulatory agencies;
- Provincial and federal agencies, as well as municipal and regional departments, with a potential or stated interest in the LWC Project and/or the LWC Project Study Area; and
- Agencies involved as part of the Feasibility Study.

Consultation with these agencies was continued as part of the EA. Any agencies that noted as part of the ToR, that continued consultation was not required, were removed from the contact list. Table 10.12 documents those agencies contacted during the LWC Project EA.

Table 10.12 Agencies Contacted During the LWC Project EA

Agency	Department(s)
City of Mississauga	• Strategic Community Initiatives, City Manager's Department • Development and Design, Planning and Building • Planning, Development and Business Services Division, Community Services Department • Transportation and Infrastructure Planning, Transportation and Works • Park Development Section, Community Services Department • Parks, Community Services • Planning • Transportation and Infrastructure Planning, Transportation and Works
City of Toronto	• Parks , Forestry and Recreation • Toronto Water • City Planning • Technical Services
Go Transit / Metrolinx	• Environmental Liaison Section
Government of Canada	• Canada Post • Environment Canada • Fisheries and Oceans Canada • Health Canada, Ontario Region • Transport Canada
Hydro One Networks Inc. (HONI)	• Environmental Services and Approvals • Transmission Lines
Infrastructure Ontario	• Professional Services • Property Development
Ontario Ministry of Aboriginal Affairs	• Consultations Unit
Ontario Ministry of Citizenship and Immigration	• Hamilton Office
Ontario Ministry of Community Safety and Correctional Services	• Accommodations and Leasing Unit, Facilities Branch
Ontario Ministry of Education	• Capital Programs Branch
Ontario Ministry of Energy	• Energy Supply Branch
Ontario Ministry of Environment (MOE)	• Environmental Approvals Branch • Technical Support Section
Ontario Ministry of Infrastructure	• Ontario Growth Secretariat
Ontario Ministry of Municipal Affairs and Housing	• Municipal Service Office - Central Ontario
Ontario Ministry of Natural Resources (MNR)	• Fish & Wildlife Biology • Integrated Resource Management • Lake Ontario Management Unit • Strategic Policy & Economics Branch

Table 10.12 Agencies Contacted During the LWC Project EA (Cont'd)

Agency	Department(s)
Ontario Ministry of Tourism, Culture and Sport	• Culture Services Unit
Ontario Power Generation (OPG)	• Corporate Relations and Communications • Law • Real Estate
Ontario Provincial Police	• Operational Policy and Strategic Planning Bureau
Region of Peel	• Community Liaison, Peel Region Police, 12 Division • Environment, Transportation & Planning Services • Planning, Policy & Research • Public Health • Transportation, Public Works • Wastewater Treatment, Public Works • Water Division, Public Works

The consultation for the LWC Project EA included a Technical Advisory Committee (TAC) and individual meetings with key agencies, including the MNR, DFO, MOE, OPG, the Region of Peel, the City of Mississauga, and the City of Toronto. A variety of consultation mechanisms were utilized in order to keep an open line of communication with all agencies, including updates to external working groups (i.e., Aquatic Habitat Toronto); email correspondence; invitations to PICs; in-person meetings; and teleconferences.

10.8.3 Technical Advisory Committee

The TAC was established as part of the LWC Project EA ToR to provide a forum for agency consultation during the ToR and EA stages. All identified regulatory and interested agencies were invited to participate on the TAC, and members were asked to recommend additional agency departments to participate if they believed key members were missing. While the Ministry of Natural Resources (MNR) was invited to participate on the TAC, MNR elected to meet with the LWC Project Team on an individual basis in lieu of the formal TAC. As an avenue to provide ongoing updates regarding the LWC Project, the MNR was included on all TAC correspondence, including meeting agendas, material, and minutes. The final TAC membership for the EA phase is provided in Table 10.13.

Table 10.13 Final TAC membership

Agency	Department(s)
City of Mississauga	• Strategic Community Initiatives, City Manager's Department • Development and Design, Planning and Building • Planning, Development and Business Services Division, Community Services Department • Transportation and Infrastructure Planning, Transportation and Works • Park Development Section, Community Services Department • Parks, Community Services • Planning • Transportation and Infrastructure Planning, Transportation and Works
City of Toronto	• Parks , Forestry and Recreation • Toronto Water • Works & Emergency Services • City Planning
Environment Canada	• Strategic Integration & Partnership Division, Great Lakes Area of Concern
Fisheries and Oceans Canada	
Ministry of Energy	• Energy Supply Branch
Ministry of the Environment	• Technical Support Section • Environmental Approvals Branch
Region of Peel	• Public Health • Transportation, Public Works • Wastewater Treatment Division, Public Works • Water Division, Public Works

Two TAC meetings were held, as part of the EA phase of the LWC Project on January 14, 2013 and March 18, 2013. In lieu of a third TAC meeting, individual meetings were held with TAC agencies in order to facilitate the flow of discussion and comments with regards to the LWC Project. Table 10.14 provides an overview of the TAC meetings, including the objectives and attendance. An overview of individual meetings held in lieu of a third TAC meeting is documented in Section 9.8.4. Appendix E-8 provides the meeting agendas, presentations, and material.

Table 10.14 TAC Meetings

Event & Date	Objectives	Attendance
TAC Meeting #1 January 14, 2013	• To provide TAC with EA status update and schedule. • To seek TAC review and comment on the Alternative LWC Project Configurations; the approach to the comparative evaluation; and the comparative evaluation criteria.	17 TAC members
TAC Meeting #2 March 18, 2013	• To report back to the TAC on the evaluation of the LWC Project Alternative Configurations and the identification of a Preferred Alternative. • To seek comment on the evaluation and the selection of a Preferred Alternative. • Discuss potential refinements to the Preferred Alternative. • Discuss next steps.	10 TAC members

10.8.4 Agency Meetings

In addition to consultation through the TAC, a number of individual agency consultation meetings were held.

10.8.4.1 Ministry of Natural Resources (MNR)

Throughout the EA, the LWC Project team met with MNR to provide updates regarding the LWC Project EA and seek input into the LWC Project. Table 10.15 provides an overview of correspondence and meetings with MNR during the EA phase. Appendix E-8 provides the meeting agendas, presentations, and material.

Table 10.15 Consultation Activities Held with MNR

Date	Purpose
January 10, 2013	• Provide MNR with update on the LWC Project EA status; schedule; and change in Project Study Area. • Seek MNR review and comment on the Alternative LWC Project Configurations; how alternatives were developed; the approach to the comparative evaluation; the comparative evaluation criteria; and proposed configurations for Serson Creek.
April 2, 2013	• Report back to the MNR on the evaluation of the Alternative LWC Project Configurations and the identification of a Preferred Alternative. • Seek comment on the evaluation and the selection of a Preferred Alternative. • Discuss potential refinements to the Preferred Alternative. • Discuss next steps.
October 29, 2013	• Provide MNR with an update on the LWC Project EA consultation activities and refinements to the Preferred Alternative; • Present the proposed construction access route and preliminary phasing plan; • Present the results of the Detailed Assessment of the Refined Preferred Alternative; • Discuss opportunities to incorporate cold water fish habitat as part of detailed design works; and • Discuss the anticipated EA timelines.
November 7, 2013 (AHT Meeting)	• Provide AHT with an update on the LWC Project EA consultation activities and refinements to the Preferred Alternative; • Present the proposed construction access route and preliminary phasing plan; • Present the results of the Detailed Assessment of the Refined Preferred Alternative; • Discuss the HAAT modelling completed in support of the LWC Project EA; and • Discuss the anticipated EA timelines.

10.8.4.2 Fisheries and Oceans Canada (DFO)

Throughout the EA, the LWC Project team met with DFO to seek input. In addition to DFO's participation on the TAC, the LWC Project team provided regular updates as part of Aquatic Habitat Toronto (AHT) meetings, and through individual meetings, as outlined in Table 10.16. Appendix E-8 documents the presentations.

Table 10.16 Consultation Activities held with DFO

Date	Purpose
March 27, 2013	• To seek DFO's input into HAAT modeling as part of the LWC Project.
April 4, 2013 (AHT Meeting)	• Present the Preferred Alternative; and • Discuss aquatic habitat created and improved as part of the LWC Project.
June 6, 2013 (AHT Meeting)	• Provide AHT with an update on the LWC Project EA, including status and schedule; and • Discuss refinements to the Preferred Alternative.
November 6, 2013 (AHT Meeting)	• Provide AHT with an update on the LWC Project EA consultation activities and refinements to the Preferred Alternative; • Present the proposed construction access route and preliminary phasing plan; • Present the results of the Detailed Assessment of the Refined Preferred Alternative; • Discuss the HAAT modelling completed in support of the LWC Project EA; and • Discuss the anticipated EA timelines.

10.8.4.3 Ministry of the Environment (MOE)

The LWC Project team initiated communication with the MOE at the commencement of the LWC Project EA, and has maintained an open line of communication throughout the EA phase. Communication mechanisms included email status updates, teleconferences, and in-person meetings. Table 10.17 provides an overview of consultation activities with MOE. Appendix E-8 provides the meeting agendas, presentations, and material.

Table 10.17 Consultation Activities Held with MOE

Date	Purpose
December 18, 2012	• Provide MOE with a status update regarding the LWC Project EA, including schedule, amended Project Study Area to include the OPG waterlots, and potential to reroute Serson Creek through the current overflow channel; and • Present the Alternative Project Configurations and Preliminary Evaluation Criteria.
July 19, 2013	• Provide MOE with an update on the LWC Project EA status; schedule; and • Discuss the preliminary proposed construction access route and mitigative measures.
October 21, 2013	• Provide MOE with an update on the LWC Project EA consultation activities and refinements to the Preferred Alternative; • Present the proposed construction access route and preliminary phasing plan; • Present the results of the Detailed Assessment of the Refined Preferred Alternative; and • Discuss the anticipated EA timelines.

10.8.4.4 Ontario Power Generation (OPG)

The LWC Project team has engaged with OPG throughout the ToR and EA phases of the LWC Project. In addition to individual meetings held with OPG, and as a means to maintain an open line of communication, OPG was invited to participate on the LWC Project team teleconference meetings. The agendas and minutes of the Project team teleconferences were circulated to OPG. Table 10.18 provides an overview of consultation activities with OPG. Appendix E-8 provides the meeting agendas, presentations, and material.

Table 10.18 Consultation Activities Held with OPG

Date	Purpose
November 12, 2012	• Discuss opportunities to access OPG waterlots and Serson Creek as part of the LWC Project, pending ToR approvals.
November 21, 2012 (Teleconference)	• LWC Project team teleconference. • Provide an update on the status of the LWC Project, including consultation timelines and Serson Creek realignment opportunities realignment opportunities.
January 3, 2013 (Teleconference)	• LWC Project team teleconference. • Provide an update on the status of the LWC Project and next steps.
March 28, 2013	• Provide an update on the LWC Project
May 9, 2013 (Webinar)	• LWC Project team teleconference with drawings presented via webinar. • Discuss potential construction access routes. • Present the preliminary refined Preferred Alternative. • Present the draft rough grading plan of the LWC Project.
June 13, 2013 (Webinar)	• LWC Project team teleconference, with drawings presented via webinar. • Present the refined draft grading plan and discuss public feedback with regards to the LWC Project.
July 31, 2013 (Webinar)	• LWC Project team teleconference, with drawings presented via webinar. • Present the refined Preferred Alternative, artist's renderings and the temporary construction access. • Provide the proposed dates for the next round of consultation activities. • Provide an overview of the expanded outreach being undertaken throughout the summer at Marie Curtis Park and Lakefront Promenade Park.
November 14, 2013	• Provide OPG with an update on the LWC Project EA consultation activities and refinements to the Preferred Alternative. • Discuss the availability of OPG waterlots. • Present the preliminary construction phasing plan and the results of the Detailed Assessment of the Refined Preferred Alternative. • Discuss the anticipated EA timelines.

10.8.4.5 City of Mississauga

As a LWC Project team member, the City of Mississauga provided Inspiration Lakeview portfolio management and assisted with coordination between relevant City of Mississauga departments. In addition to the City of Mississauga's participation on the TAC and regular bi-weekly LWC Project team meetings, individual meetings were held with City of Mississauga

departments to discuss the LWC Project. Table 10.19 provides an overview of consultation activities with the City of Mississauga outside of regular LWC Project team meetings. Appendix E-8 documents the meeting agendas, presentations, and material.

Table 10.19 Consultation Activities Held with City of Mississauga

Date	Purpose
November 21, 2012 (Teleconference)	• LWC Project team teleconference; and • Provide an update on the status of the LWC Project, including consultation timelines and Serson Creek realignment opportunities.
January 3, 2013 (Teleconference)	• LWC Project Team teleconference; and • Provide an update on the status of the LWC Project and next steps.
March 6, 2013	• Seek input into potential access routes from the QEW to Lakeshore Road; and from Lakeshore Road to the LWC Project site at the water's edge.
May 9, 2013 (Webinar)	• LWC Project Team teleconference with drawings presented via webinar; • Provide an overview of the potential construction access routes; and • Present the preliminary refined Preferred Alternative and draft rough grading plan of the LWC Project.
June 13, 2013 (Webinar)	• LWC Project Team teleconference, with drawings presented via webinar; and • Present the refine draft grading plan and discuss public feedback with regards to the LWC Project.
July 31, 2013 (Webinar)	• LWC Project Team teleconference, with drawings presented via webinar; • Present the refined Preferred Alternative and artist's renderings; • Present the temporary construction access; • Provide the proposed dates for the next round of consultation activities; and • Provide an overview of the expanded outreach being undertaken throughout the summer at Marie Curtis Park and Lakefront Promenade Park.
August 27, 2013	• Seek input from City of Mississauga regarding the proposed access routes from Lakeshore Road to the project site at the water's edge.
November 1, 2013	• Provide the City of Mississauga's Corporate Services, Transportation & Works, and Planning & Building Departments with an update on the LWC Project EA, including consultation activities and refinements to the Preferred Alternative; • Present the preliminary construction phasing plan and proposed construction access route through the Arsenal Lands; • Seek comment on the proposed temporary Waterfront Trail closure mitigation measures and opportunity to create a right-hand turn lane for truck traffic entering the LWC Project site from Lakeshore Road East; • Present the results of the Detailed Assessment of the Refined Preferred Alternative; and • Discuss the anticipated EA timelines.
November 4, 2013	• Provide the City of Mississauga's Corporate Services and Community Services Departments with an update on the LWC Project EA, including consultation activities and refinements to the Preferred Alternative; • Present the preliminary construction phasing plan and proposed construction access route through the Arsenal Lands; • Seek comment on the proposed temporary Waterfront Trail closure mitigation measures; • Present the results of the Detailed Assessment of the Refined Preferred Alternative; • Discuss the potential opportunity to reinitiate the Arsenal Lands Master Planning process concurrently with the LWC Project; and • Discuss the anticipated EA timelines.

10.8.4.6 City of Toronto

In addition to the City of Toronto's participation on the TAC, additional individual meetings were held with the City of Toronto to maintain an open line of communication with City staff and provide a forum for detailed discussions regarding the Project as it relates to the City of Toronto. Table 10.20 provides an overview of consultation activities with the City of Toronto outside of regular TAC meetings. Appendix E-8 provides the meeting agendas, presentations, and material.

Table 10.20 Consultation activities held with City of Toronto

Date	Purpose
January 8, 2013	To provide an update regarding the LWC Project EA status, schedule, and change in Project Study Area and to seek review and comment regarding the Alternative LWC Project Configurations, in particular, Island C, in terms of ownership, operations, and other City of Toronto priorities.
July 31, 2013	To provide an overview of the refinements to the preliminary Preferred Alternative completed in response to comments received as part of PIC#2 regarding sand beach at Marie Curtis Park beach west, and discuss key comments and concerns received with regards to the LWC Project.
October 31, 2013	To provide an update on the LWC Project EA consultation activities and refinements to the Preferred Alternative; present the proposed construction access route, preliminary phasing plan, and results of the Detailed Assessment of the Refined Preferred Alternative; and discuss the anticipated EA timelines.

10.8.4.7 Environment Canada

In addition to Environment Canada's participation on the TAC, the LWC Project team provided regular updates as part of Aquatic Habitat Toronto (AHT) meetings, and through individual meetings, as outlined in Table 10.21. Appendix E-8 documents the meeting agendas, presentations, and material.

Table 10.21 Consultation Activities held with Environment Canada

Date	Purpose
April 4, 2013 (AHT Meeting)	• Present the Preferred Alternative; and • Discuss aquatic habitat created and improved as part of the LWC Project.
June 6, 2013 (AHT Meeting)	• Provide AHT with an update on the LWC Project EA, including status and schedule; and • Discuss refinements to the Preferred Alternative.
November 7, 2013 (AHT Meeting)	• Provide AHT with an update on the LWC Project EA consultation activities and refinements to the Preferred Alternative; • Present the proposed construction access route and preliminary phasing plan; • Present the results of the Detailed Assessment of the Refined Preferred Alternative; • Discuss the HAAT modelling completed in support of the LWC Project EA; and • Discuss the anticipated EA timelines.

10.8.4.8 Region of Peel

As the LWC Project co-proponent, Region of Peel provided project oversight and assisted with coordination between relevant Region of Peel departments. In addition to the Region of Peel's participation on the TAC, individual meetings were held with Region of Peel departments to discuss the LWC Project. Table 10.22 provides an overview of consultation activities with the Region of Peel outside of regular LWC Project team meetings. Appendix E-8 documents the meeting agendas, presentations, and material.

Table 10.22 Consultation Activities held with Region of Peel

Date	Purpose
November 21, 2012 (Teleconference)	• LWC Project team teleconference; and • Provide an update on the status of the LWC Project, including consultation timelines and Serson Creek realignment opportunities.
January 3, 2013 (Teleconference)	• LWC Project Team teleconference; and • Provide an update on the status of the LWC Project and next steps.
May 9, 2013 (Webinar)	• LWC Project Team teleconference with drawings presented via webinar; • Provide an overview of the potential construction access routes; and • Present the preliminary refined Preferred Alternative and draft rough grading plan of the LWC Project.
June 13, 2013 (Webinar)	• LWC Project Team teleconference, with drawings presented via webinar; and • Present the refined draft grading plan and discuss public feedback with regards to the LWC Project.
July 18, 2013	• Provide the WWTF staff and local Councillor with an update regarding the LWC Project, including the Refined Preferred Alternative and preliminary cost analysis; and • Present preliminary construction access and proposed construction viewing options.
July 31, 2013 (Webinar)	• LWC Project Team teleconference, with drawings presented via webinar; • Present the refined Preferred Alternative and artist's renderings; • Present the temporary construction access; • Provide the proposed dates for the next round of consultation activities; and • Provide an overview of the expanded outreach being undertaken throughout the summer at Marie Curtis Park and Lakefront Promenade Park.
October 24, 2013	• Received direction from RoP Council to proceed with Detailed Design pending EA approval.
November 4, 2013	• Provide Region of Peel Water Division, Wastewater Treatment Division, and Public Health department with an update on the LWC Project EA consultation activities and refinements to the Preferred Alternative; • Present the proposed construction access route and preliminary phasing plan; • Present the results of the Detailed Assessment of the Refined Preferred Alternative; and • Discuss the anticipated EA timelines.

11.0 ADVANTAGES AND DISADVANTAGES

In concluding the EA, the overall advantages and disadvantages of the LWC Project need to be articulated and assessed. Advantages are positive net effects to the natural and human environment, and disadvantages are negative net effects. The purpose of this section is to provide an overall conclusion as to whether, in comparison to the "Do Nothing" Alternative, the negative net effects of the LWC Project are acceptable, based on a balanced assessment against the positive benefits. As noted in Section 4.2.1, the "Do Nothing" alternative does not meet four of the five LWC Project objectives including improved waterfront access and habitat conditions. However, the *EA Act* requires this final comparison of the undertaking to the "Do Nothing" alternative to develop final conclusions.

Table 11.1 summarizes the key advantages and disadvantages of the LWC Project.

Table 11.1 Advantages and Disadvantages of the LWC Project

Project Objective	Advantages	Disadvantages
Naturalization	• Creation of up to 33 ha of terrestrial habitat including meadow, beach, forest, open wetland, treed swamp and rocky island; • Enhancement of 6 ha of open coast habitat; • Increase in the irregularity and diversity of shoreline types including an overall increase in shoreline length and improvement of aquatic habitat; and • Increase in the amount and availability of aquatic habitat in Serson and Applewood Creeks including better connections with Lake Ontario and incorporation of habitat features such as rocky ramps and improved riparian vegetation. The LWC Project connects 1,800 m of aquatic habitat in Serson Creek that is currently inaccessible to fish.	• Land creation will result in the loss or alteration of 39 ha of highly degraded open coast aquatic habitat; • Minor vegetation removal along the construction access route and riparian habitat along Serson and Applewood Creeks during construction; and • Alteration of successional processes on the beach ridge at the mouth of Applewood Creek.

Table 11.1 Advantages and Disadvantages of the LWC Project (Cont'd)

Project Objective	Advantages	Disadvantages
Access	• Addition of 1,110 m of publically accessible cobble beach (with finer gravel/sand material in the northeastern most cell); • A new Waterfront Trail connection linking Marie Curtis Park to the OPG lands along the water's edge; • New views from the created landform to Lake Ontario and back towards Marie Curtis Park, Serson Creek and the cities of Mississauga and Toronto; • Potential for additional secondary trail system; and • Water quality along the Marie Curtis Park beaches are expected to remain the same or improve moderately due to reduced nearshore residence time following storm events from Etobicoke Creek and other contributing local watersheds.	• Closure and re-routing of 770 m of Waterfront Trail during construction; • Nuisance effects from construction (dust, noise, vehicle emissions) for local users; • Net loss or alteration of up to 235 m of publically accessible sand beach at water's edge. Of this 235 m, 50 m will remain largely the same as existing conditions southwest of the groyne structure with predominantly sand/gravel material in summer and transitioning to larger material further southwest.; and • New landform represents a new navigational hazard for windsurfers and kiteboarders.
Compatibility	• Water quality at the Water Treatment Plant intakes is expected to remain the same or improve following construction; and • No negative effects to WWTF outfalls or security.	• Minor increases in traffic during the construction period; and • Additional demand on parking availability in surrounding areas to be discussed with City of Mississauga with respect to provision of parking within Arsenal Lands and Inspiration Lakeview.
Coordination	• Consistent with a number of City of Mississauga Waterfront Parks Strategy goals including improving trail connections and providing more natural, sustainable ecological features; • Consistent with the Visioning for Inspiration Lakeview; • Consistent with the LOISS priorities including restoration of natural ecosystems and creation of terrestrial and aquatic habitat; • Consistent with the Lake Ontario Biodiversity Strategy targets including the creation of aquatic habitat that will	• Access road construction will affect 5 m of Waterfront Trail that has been upgraded as part of the Marie Curtis Park Revitalization Plan.

Table 11.1 Advantages and Disadvantages of the LWC Project (Cont'd)

Project Objective	Advantages	Disadvantages
	restore connections and quality of nearshore waters; • Opportunity to meet future conditions for the Arsenal Lands; • Consistent with Marie Curtis Park Revitalization Plan to provide improved Waterfront Trail connections along the waterfront; and • Consistent with the goals of MNR's Fish Community Objectives for Lake Ontario including opportunities to enhance coldwater piscivore habitat along the nearshore area.	
Fiscal Viability	• ~$160 million in economic output; • ~$80 million in GDP; • ~900 net full time jobs; and • Reduced pressure on rural fill disposal sites.	• None.

A review of Table 11.1 clearly illustrates that the outcomes of the LWC Project are strongly beneficial for all aspects of the environment, resulting in a rejuvenated waterfront that will allow improved public access to the water's edge, provide habitat for fish and wildlife, and be a destination for residents and visitors alike.

The LWC Project will achieve the objectives set out in the ToR and reaffirmed in the EA by:

- creating ecologically functional fish and wildlife habitat;
- providing a substantial increase in publically accessible waterfront;
- contributing to the goals and objectives of related plans and policies in the area; and
- not negatively affecting existing infrastructure.

Naturalization will create higher-quality aquatic, terrestrial and wetland habitat, which will lead to increased biodiversity, significantly-improved habitat connections, more resilient river systems in Applewood and Serson Creeks, and a number of new passive recreational opportunities.

Construction of the LWC Project will have the benefit of improving local economic conditions by creating a significant number of construction-related jobs. The costs of the LWC Project (capital costs and maintenance) will be partially offset by the savings associated with the diversion of fill and construction rubble from disposal sites.

The disadvantages of the LWC Project will primarily occur during construction. Temporary negative effects include minimal nuisance effects (i.e., air, noise and traffic) to recreational users and businesses, all of which will be minimized by best management practices. The permanent loss or alteration of low quality habitat will be offset by large gains in higher quality and higher functioning habitat, as described above. The loss of publically accessible sand beach at the far west end of Marie Curtis Park is offset by a substantial increase in overall beach access.

In conclusion, the negative net effects of the LWC Project, most of which occur during construction and are considered to be temporary or negligible, are more than offset by the much greater positive contributions of the LWC Project, including naturalization and recreational opportunities, coordination with other planning initiatives and economic benefits. The LWC Project will transform a degraded area with limited potential for use into a spectacular public greenspace. The final outcome of the LWC Project is an environment far superior to existing conditions.

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